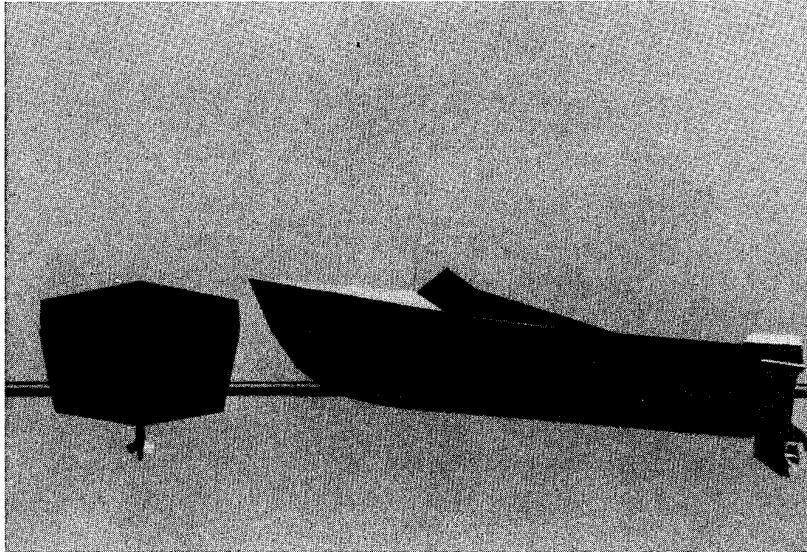


# Recreational Boat Collision Accident Research

Volume 2  
Appendices: Computer Simulation Data

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*Sponsored by a grant from The U.S. Coast Guard*

19950109 047

Miles A. Beam III, P.E.  
Senior Project Engineer  
Marine Department



Underwriters Laboratories Inc.

12 Laboratory Drive, P.O. Box 13995, Research Triangle Park, North Carolina 27709-3995

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October 1992

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# **APPENDIX A**

## **Specifications for the Computer Simulation**



COMPUTER SIMULATION OF A RECREATIONAL BOAT COLLISION ACCIDENT  
Guidelines for the Simulation

June 21, 1991

ABSTRACT

Under a grant from the United States Coast Guard, Underwriters Laboratories, Inc. Marine Department is conducting research to develop techniques for reconstructing collision accidents involving recreational boats. One of the purposes of this research is to identify technologies that have proven useful in other areas of accident reconstruction that may contribute significantly to the analysis of boat collisions. One of the technologies that has been recognized as providing much success in the past is that of computer simulation and computer aided accident reconstruction. This document outlines the necessary steps to be taken in which an attempt will be made to model a boat collision accident using state of the art computer simulation technology.

INTRODUCTION  
Guidelines for the Simulation

The contents of this document are provided so that those who are involved in the execution of this computer simulation project have a common starting point, and are aware of the desired goals and methods anticipated. It is in no way intended to limit the creativity of those involved, or place bounds on innovative solutions to complex problems. This is the first attempt known to date where the complex dynamics of a recreational small boat collision have been modeled using computer simulation. Since this is the first attempt at such a project, it would not be wise to develop a set of rigid inflexible requirements to which this simulation must comply. Instead however, the contents of this document are to be considered as guidelines. Great care has been given to the concepts outlined herein. Participants in this project should not deviate from the guidelines herein, unless approval is obtained from the UL Collision Research Project Coordinator.

Background

The science of accident reconstruction has advanced rapidly in numerous areas in the last twenty years, especially where aircraft and automobiles are involved. Advances in technology, years of intensive research, and proper training of investigators have provided the capability of reconstructing many accidents today, that would once have been thought impossible.

In spite of advances in other transportation media, the area of collision accident reconstruction involving recreational boats remains one area that is still undeveloped. There are no textbooks, no past studies, no databases of structural crash data, and essentially no "experts" which can fully unravel the dynamics of boat collisions.

The United States Coast Guard has recognized the lack of data available on boating collision accident reconstruction techniques, and the need for such information. This type of data is essential to the understanding of the dynamics of boat collisions, and is part of the overall process of understanding what happens to the vessels, and the occupants involved in a collision. Under a grant from the United States Coast Guard, Underwriters Laboratories, Inc. is conducting research to develop the necessary techniques to reconstruct various types of boating collision accidents. Part of this research is to investigate the feasibility and usefulness of computer simulation with regard to accident reconstruction of boat collision accidents.

#### Purpose

The overall purpose of this project is to investigate the feasibility and the potential usefulness of computer simulation in the reconstruction and simulation of boat collisions. This is in many ways a proof of concept approach in which it is important to emphasize both future possibilities and the accuracy of the current model.

In particular, specific purposes and goals are listed below:

- 1) To simulate a common two-boat collision accident scenario
- 2) To formulate algorithms of impact that can be used to approximate the response of the boats in the collision scenario
- 3) To identify potential strengths and weaknesses of the use of computer simulation in boat collision accident reconstruction and or prediction
- 4) To identify methods to relate impact damage to the accident scenario
- 5) To evaluate the potential of using computers to explore the minimum speed threshold theory

### Scope

This simulation will cover one collision scenario. The craft modeled will be typical of boats in the 16 to 19 ft length range. The emphasis will be placed on the dynamic response of both boats involved, taking into account the hydrodynamic forces. Other than extremely simplified approximations, structural damage will not be modeled in detail. This will be a dynamic simulation, not a stress analysis of boat structures.

### METHOD

#### UL Input

The specific methods used to approximate the various complexities of the collision process are critical to producing a realistic model. The algorithms and methods of simulation are to be reviewed by UL prior to implementation into the simulation. This is to allow UL the opportunity to contribute the knowledge gained from numerous on the water collision experiments to the simulation project.

#### Collision Scenario

For this collision, one boat will be stationary and is subsequently referred to as the target boat. The second boat, referred to as the bullet boat, shall strike the target boat at approximately a 90 degree angle to the target boat centerline. The impact point should be chosen, if practicable, so as to provide the opportunity for the impacted craft to rotate in the horizontal plane about its vertical axis of rotation during the collision process. The preferred impact point is one third of the boat length as measured from the bow, and should provide ample opportunity for rotation of the target boat. This should place the impact forward of the center of gravity and the center of lateral resistance of the target boat. If this location of the impact point is not feasible, an acceptable alternative would be two-thirds of the boat length as measured from the bow.

#### Collision Speeds

The collision shall be simulated using the same scenario, and same boats, with the bullet boat traveling at each of the following speeds: 5, 10, 15, 20, 25, and 30 mph. The target boat is to be stationary prior to impact. Optional runs may be conducted at 40 and 50 mph.

#### Time Frame

The simulation should begin at least two seconds before impact and continue for one second after the bullet boat re-enters the water. In the event that the bullet boat does not leave the water, the simulation shall continue for five seconds after initial impact.

### Boat Designs

The particular boats modeled for the collision shall be typical of motorboats currently used today in the 16 to 19 ft length range. Ideally these boats should have hull forms typical of a wide variety of today's craft, rather than a design unique to a particular manufacturer or boat. In the interest of economy, the same boat shape may be used for both the bullet and the target boat. The bullet boat must have an appendage representative of an outdrive attached. The simulated outdrive is not required to pitch up during the impact.

### Engine Thrust

The thrust of the engine of the bullet boat may be a significant contributing factor to the collision process. Ideally the thrust for a given boat speed should remain constant until the propeller clears the water. One variation of this theory is that once the pitch of the bullet boat (or more accurately that of the outdrive) exceeds 5 degrees, the thrust becomes negligible. Specifics of the best time to cut the thrust forces during the collision will be provided by UL at a later time during the simulation research.

### Degrees of Freedom

The ideal simulation would model all degrees of freedom for both boats. However, for purposes of this application, the bullet boat shall be free to rotate in pitch, and translate in the vertical and horizontal directions. In other words, the bullet boat may be adequately modeled restricting motion to 3 dof, (excluding lateral displacement, roll, and yaw). Additional degrees of freedom may be modeled but the above are considered minimums.

The target boat shall have 6 dof. It shall be free to rotate and translate about all three axes.

### Gravitational, Inertial, and Contact Forces

Contact forces must be modeled between the surfaces of the two boats. Gravity is to be in effect on both boats. Both boats must be assigned mass and inertial properties representative of the types of boats they represent. Contact between the propeller and skeg on the bullet boat is to modeled relative to the hull surface of the target boat.

### Hydrodynamic Forces

To the maximum extent possible, the hydrodynamic forces should be modeled on the target boat. The buoyancy forces must be accurately modeled, as must the instantaneous center of lateral resistance (CLR). The resulting center of rotation should be modeled to the extent practicable using the relationship between the center of gravity (CG) of the boat, and the instantaneous CLR. Approximations for hydrodynamic loads in the lateral directions for the target boat should be approximated as best as possible, otherwise the resulting motion of the target boat during impact will not be at all realistic.

The hydrodynamics are less critical to the bullet boat, except that it must be oriented and placed in the correct position relative to the target boat just prior to impact. In other words the correct trim angle, and depth in water are to be varied with each boat speed to place the bullet boat in the proper position as a function of its speed. For example, we would expect the bullet boat to be in a planing orientation at 25 mph and to sit much deeper in the water at 5 mph. It is not necessary to "drive" the target boat through the water by simulating all the hydrodynamic forces involved in sustaining a planing craft driven across the water's surface.

### Friction Forces

A significant portion of the energy in a collision involving an override (where one boat literally runs over the top of another) is absorbed in friction. Coefficients of friction for the contact area between the two boats can be estimated, and should be used for the simulation. Friction will not come into play until an override situation begins to occur.

### Structural Response of Boat Hulls

The bullet boat may be treated as simple rigid object, and with no allowance necessary for deformation during impact.

The target boat must be modeled with some capability of deforming during the impact in order to approximate a realistic situation. The response of the side of hull of the target boat which is first struck must be modeled in such a way as to allow a realistic response at varying impact speeds. For example at low speeds, no penetration of the hull side will occur, and at higher speeds the hull side will be penetrated. The side deformation will be represented by a mechanical system model, rather than any kind of detailed structural analysis.

## Modeling of the Damage Response

1) Skeg/prop mark- In a typical collision scenario of the type being modeled here, the propeller and/or the skeg of the lower unit of the engine usually leaves a distinct cut in the side of the hull where it penetrated. This mark can be used to establish at one point in time a fairly definite relative geometry of the two boats involved. The skeg mark would be used in a reconstruction analysis in conjunction with the geometry of the target boat to estimate the boats' most likely relative positions. The point where the outdrive on the bullet boat penetrates the hull of the target boat should be indicated on the target boat after the collision. A simple mark placed where the propeller or "torpedo" (i.e. the gearcase) penetrated the side of the hull is sufficient. It is not necessary for the graphics on the target boat to model a "damaged" appearance. It will not be necessary to simulate the desired force required to tip up the outdrive during impact.

2) Scratch Evidence and Transfer Marks- When two boats are in contact with each other, the scratches left behind indicate the path of one relative to the other. Ideally, the computer should keep track of the path of the contact points of the propeller or skeg through the target boat during the collision. At a minimum, these points should have a line drawn through them on the target boat after the collision. This line should indicate the path of the bullet boat through the target boat during the collision. It should be noted that if significant rotation of the target boat occurs about the vertical axis that this line may not be straight. It is not required that contact line be drawn on the bottom of the hull of the bullet boat for this simulation, however such a line would reveal if significant rotation of the stationary target boat during impact causes lines on the bottom of the of the bullet boat that are not parallel to the centerline.

## Simulation Software

The simulation will be conducted using the ADAMS (Automatic Dynamic Analysis of Mechanical Systems) software.

## Graphics

Final graphic output of the simulation will be performed using the "Animator" software package from Simulation Dynamics, Inc.

#### DATA REQUIREMENTS

Data should be provided in both tabulated and graphical forms. Tabulated should be provided for the parameters listed below. Alternative data requiring equivalent effort may be provided subject to the agreement of all concerned.

Values for the cg of the bullet boat, and for the cg of the target boat, as a function of time and expressed as

- 1) x,y, and z (position)
- 2) x',y',z' (velocity)
- 3) x'',y'', z'' (acceleration)

Values for the pitch angle of the bullet boat as a function of time expressed as

- 1) pitch angle
- 2) pitch rate
- 3) pitch acceleration

Values for the yaw angle of the target boat as a function of time expressed as

- 1) yaw angle
- 2) yaw rate
- 3) yaw acceleration

Selected graphs will be necessary to assist with the analysis of the simulations. The graphical output would likely be selected graphs from the following list. Not all of these graphs would be required for each simulation run. The graphs most useful to the data analysis would be selected once the project has begun. Possible useful graphs would likely be:

For the bullet boat:

A) Vertical coordinate of the cg vs. the downrange travel, or z as a function of x. (Assuming z is the vertical axis, and x is the horizontal axis parallel to the centerline of the bullet boat). This should provide the visual plot of the flight path of the cg of the bullet boat.

B) Components of acceleration, vertical and horizontal as a function of time.

C) The resultant total acceleration value of the cg of the bullet boat as a function of time.

D) Pitch acceleration as a function of time.

For the target boat:

- E) The yaw acceleration as a function of time
- F) The lateral position of the cg as a function of time
- G) The lateral acceleration of the cg as function of time

#### DOCUMENTATION REQUIREMENTS

The documentation provided for the simulation should include all necessary information such that anyone who is equipped with the ADAMS software and the necessary computer hardware can execute the application run. The documentation should also include videotapes of the runs conducted. The specifics are outlined below:

- 1) Printed output of the ADAMS source code including the ADAMS data set and FORTRAN subroutines with adequate documentation
- 2) One original videotape of simulation in U-matic format
- 3) Three copies of videotape of simulation in VHS format
- 4) Two diskette copies of all data including boat modeling information and other data used in the simulation
- 5) If practicable, a disk file with tabulated data of selected parameters for future analysis

The videotapes of the simulation should contain runs at real time, and for the higher speed runs over 10 mph, it is desirable for the runs to be also recorded in slow motion.

#### ACCESSIBILITY OF DATA

This project is being conducted under a grant from the United States Coast Guard. As such, all data acquired under this program is subject to becoming a part of the UL report submitted to the USCG upon completion of the project.



## **APPENDIX B**

### **ADAMS - User Defined Subroutines**

Makefile Tue Nov 5 13:17:49 1991 1

```
OPT = -g
LIBS =
SRC = SFMAIN.f REQSUB.f SFOSUB.f HULLGM.f UTILS.f
OBJ = $(SRC:.f=.o)
ALL = ulsta
DBGALL = uldbg
```

.f.o:

```
f77 $(OPT) -c $*.f
```

\$(DBGALL): \$(OBJ) Makefile

```
f77 $(OPT) $(OBJ) $(LIBS) -o $(DBGALL)
@echo "Compilation is complete"
```

adams: \$(OBJ)

```
/usr/local/applications/mdi521/mdi cr-u i n REQSUB.o SFOSUB.o HULLGM.o UTILS.o -n $(ALL) exit
strip $(ALL)
@echo "ADAMS build complete"
```

clean:

```
rm -f $(ALL) $(OBJ)
@echo "Executables and object files have been removed"
```

```

C*****
C HULLGM.f
C
C 910829 BAP      The hull geometry subroutine is given a displacement
C                  vectomy and computes various geometric points, lengths,
C                  areas and volumes. The hull geometry data points are
C                  contained in this file and should correspond to the
C                  ADAMS graphics.
C*****
C SUBROUTINE HULLGM(CMREF, STATE, VOLUME, CENTRD, WTKEEL, WTBEAM,
2   LTAREA, ERRFLG)
C
C IMPLICIT DOUBLE PRECISION (A-H, O-Z)
C DOUBLE PRECISION CMREF(3)
C DOUBLE PRECISION STATE(6)
C DOUBLE PRECISION VOLUME
C DOUBLE PRECISION CENTRD(3)
C DOUBLE PRECISION WTKEEL
C DOUBLE PRECISION WTBEAM
C DOUBLE PRECISION LTAREA
C LOGICAL ERRFLG
C
C DOUBLE PRECISION A(3), B(3), C(3)
C DOUBLE PRECISION DSHULL(90, 3)
C DOUBLE PRECISION HULL(90, 3)
C INTEGER INIT
C DOUBLE PRECISION OSTATE(6)
C DOUBLE PRECISION VECTOR(6)
C
C DATA CMREF / 11.511, 0., 2. /
C DATA CMREF / 11.770, 0., 2.00 /
C DATA INIT / 0 /
C
C marker/2000, qp= 0.000, 0.000, 4.083
C
DATA (DSHULL( 1, J), J=1,3) / 1.000, 1.333, 3.979 /
DATA (DSHULL( 2, J), J=1,3) / 1.000, 0.000, 2.292 /
DATA (DSHULL( 3, J), J=1,3) / 1.000, 0.000, 2.292 /
DATA (DSHULL( 4, J), J=1,3) / 1.000, 0.000, 2.292 /
DATA (DSHULL( 5, J), J=1,3) / 1.000, -1.333, 3.979 /
C
DATA (DSHULL( 6, J), J=1,3) / 2.000, 2.167, 3.875 /
DATA (DSHULL( 7, J), J=1,3) / 2.000, 0.708, 2.042 /
DATA (DSHULL( 8, J), J=1,3) / 2.000, 0.000, 1.125 /
DATA (DSHULL( 9, J), J=1,3) / 2.000, -0.708, 2.042 /
DATA (DSHULL(10, J), J=1,3) / 2.000, -2.167, 3.875 /
C
DATA (DSHULL(11, J), J=1,3) / 3.000, 2.708, 3.813 /
DATA (DSHULL(12, J), J=1,3) / 3.000, 1.625, 1.750 /
DATA (DSHULL(13, J), J=1,3) / 3.000, 0.000, 0.500 /
DATA (DSHULL(14, J), J=1,3) / 3.000, -1.625, 1.750 /
DATA (DSHULL(15, J), J=1,3) / 3.000, -2.708, 3.813 /
C
DATA (DSHULL(16, J), J=1,3) / 4.000, 3.021, 3.708 /
DATA (DSHULL(17, J), J=1,3) / 4.000, 2.125, 1.521 /
DATA (DSHULL(18, J), J=1,3) / 4.000, 0.000, 0.208 /
DATA (DSHULL(19, J), J=1,3) / 4.000, -2.125, 1.521 /
DATA (DSHULL(20, J), J=1,3) / 4.000, -3.021, 3.708 /
C
DATA (DSHULL(21, J), J=1,3) / 5.000, 3.229, 3.625 /
DATA (DSHULL(22, J), J=1,3) / 5.000, 2.458, 1.292 /
DATA (DSHULL(23, J), J=1,3) / 5.000, 0.000, 0.063 /
DATA (DSHULL(24, J), J=1,3) / 5.000, -2.458, 1.292 /
DATA (DSHULL(25, J), J=1,3) / 5.000, -3.229, 3.625 /
C
DATA (DSHULL(26, J), J=1,3) / 6.000, 3.333, 3.521 /
DATA (DSHULL(27, J), J=1,3) / 6.000, 2.667, 1.063 /
DATA (DSHULL(28, J), J=1,3) / 6.000, 0.000, 0.000 /
DATA (DSHULL(29, J), J=1,3) / 6.000, -2.667, 1.063 /
DATA (DSHULL(30, J), J=1,3) / 6.000, -3.333, 3.521 /
C
DATA (DSHULL(31, J), J=1,3) / 7.000, 3.417, 3.458 /
DATA (DSHULL(32, J), J=1,3) / 7.000, 2.833, 0.833 /
DATA (DSHULL(33, J), J=1,3) / 7.000, 0.000, 0.000 /
DATA (DSHULL(34, J), J=1,3) / 7.000, -2.833, 0.833 /
DATA (DSHULL(35, J), J=1,3) / 7.000, -3.417, 3.458 /
C
DATA (DSHULL(36, J), J=1,3) / 8.000, 3.458, 3.333 /
DATA (DSHULL(37, J), J=1,3) / 8.000, 2.896, 0.667 /
DATA (DSHULL(38, J), J=1,3) / 8.000, 0.000, 0.000 /
DATA (DSHULL(39, J), J=1,3) / 8.000, -2.896, 0.667 /
DATA (DSHULL(40, J), J=1,3) / 8.000, -3.458, 3.333 /
C
DATA (DSHULL(41, J), J=1,3) / 9.000, 3.500, 3.271 /
DATA (DSHULL(42, J), J=1,3) / 9.000, 2.917, 0.583 /
DATA (DSHULL(43, J), J=1,3) / 9.000, 0.000, 0.000 /
DATA (DSHULL(44, J), J=1,3) / 9.000, -2.917, 0.583 /
DATA (DSHULL(45, J), J=1,3) / 9.000, -3.500, 3.271 /
C
DATA (DSHULL(46, J), J=1,3) / 10.000, 3.500, 3.208 /
DATA (DSHULL(47, J), J=1,3) / 10.000, 2.938, 0.500 /
DATA (DSHULL(48, J), J=1,3) / 10.000, 0.000, 0.000 /
DATA (DSHULL(49, J), J=1,3) / 10.000, -2.938, 0.500 /
DATA (DSHULL(50, J), J=1,3) / 10.000, -3.500, 3.208 /
C
DATA (DSHULL(51, J), J=1,3) / 11.000, 3.500, 3.208 /
DATA (DSHULL(52, J), J=1,3) / 11.000, 2.938, 0.500 /
DATA (DSHULL(53, J), J=1,3) / 11.000, 0.000, 0.000 /
DATA (DSHULL(54, J), J=1,3) / 11.000, -2.938, 0.500 /
DATA (DSHULL(55, J), J=1,3) / 11.000, -3.500, 3.208 /
C
DATA (DSHULL(56, J), J=1,3) / 12.000, 3.500, 3.208 /
DATA (DSHULL(57, J), J=1,3) / 12.000, 2.938, 0.500 /
DATA (DSHULL(58, J), J=1,3) / 12.000, 0.000, 0.000 /
DATA (DSHULL(59, J), J=1,3) / 12.000, -2.938, 0.500 /
DATA (DSHULL(60, J), J=1,3) / 12.000, -3.500, 3.208 /
C
DATA (DSHULL(61, J), J=1,3) / 13.000, 3.500, 3.208 /
DATA (DSHULL(62, J), J=1,3) / 13.000, 2.938, 0.500 /
DATA (DSHULL(63, J), J=1,3) / 13.000, 0.000, 0.000 /
DATA (DSHULL(64, J), J=1,3) / 13.000, -2.938, 0.500 /
DATA (DSHULL(65, J), J=1,3) / 13.000, -3.500, 3.208 /
C
DATA (DSHULL(66, J), J=1,3) / 14.000, 3.500, 3.208 /
DATA (DSHULL(67, J), J=1,3) / 14.000, 2.938, 0.500 /
DATA (DSHULL(68, J), J=1,3) / 14.000, 0.000, 0.000 /
DATA (DSHULL(69, J), J=1,3) / 14.000, -2.938, 0.500 /
DATA (DSHULL(70, J), J=1,3) / 14.000, -3.500, 3.208 /
C
DATA (DSHULL(71, J), J=1,3) / 15.000, 3.500, 3.208 /
DATA (DSHULL(72, J), J=1,3) / 15.000, 2.938, 0.500 /
DATA (DSHULL(73, J), J=1,3) / 15.000, 0.000, 0.000 /
DATA (DSHULL(74, J), J=1,3) / 15.000, -2.938, 0.500 /
DATA (DSHULL(75, J), J=1,3) / 15.000, -3.500, 3.208 /
C
DATA (DSHULL(76, J), J=1,3) / 16.000, 3.500, 3.208 /
DATA (DSHULL(77, J), J=1,3) / 16.000, 2.938, 0.500 /
DATA (DSHULL(78, J), J=1,3) / 16.000, 0.000, 0.000 /
DATA (DSHULL(79, J), J=1,3) / 16.000, -2.938, 0.500 /

```

```

DATA (DSHULL(80, J), J=1,3) / 16.000, -3.500, 3.208 /
DATA (DSHULL(81, J), J=1,3) / 17.000, 3.500, 3.208 /
DATA (DSHULL(82, J), J=1,3) / 17.000, 2.938, 0.500 /
DATA (DSHULL(83, J), J=1,3) / 17.000, 0.000, 0.000 /
DATA (DSHULL(84, J), J=1,3) / 17.000, -2.938, 0.500 /
DATA (DSHULL(85, J), J=1,3) / 17.000, -3.500, 3.208 /

DATA (DSHULL(86, J), J=1,3) / 18.000, 3.500, 3.208 /
DATA (DSHULL(87, J), J=1,3) / 18.000, 2.938, 0.500 /
DATA (DSHULL(88, J), J=1,3) / 18.000, 0.000, 0.000 /
DATA (DSHULL(89, J), J=1,3) / 18.000, -2.938, 0.500 /
DATA (DSHULL(90, J), J=1,3) / 18.000, -3.500, 3.208 /

SAVE

C write(6,*) 'hullgm called'
C write(6,*) 'state='
C write(6,*) state

IF (INIT.EQ.0) THEN
  INIT = 1

C Check the hull array data
C DO I=1, 90
C   WRITE(6, '(15,3f10.3)') I, (DSHULL(I,J), J=1,3)
C   ENDDO

C Transform from the design position to the boat frame where
C the center of mass is at 0, 0, 0

C Transform the points to the BOAT frame
  VECTOR(1) = -CMREF(1)
  VECTOR(2) = -CMREF(2)
  VECTOR(3) = -CMREF(3)
  VECTOR(4) = 0.
  VECTOR(5) = 0.
  VECTOR(6) = 0.
  CALL XFORM(DSHULL, DSHULL, 90, VECTOR, ERRFLG)
  ENDDO

C Transform the points to the GLOBAL frame
  CALL XFORM(DSHULL, HULL, 90, STATE, ERRFLG)

C Find the submerged volume and its centroid
  CALL SUBVOL(HULL, 90, 18, VOLUME, CENTRD, ERRFLG)

C Find the wetted keel.

C Assume that the transom is the last to leave and the first to
C enter.

C Search for the first point under water.
  ICROSS = 0
  DO ISTA = 1, 18
    I = (ISTA-1)*5 + 3
    IF (ICROSS.EQ.0.AND. HULL(I,3).LT.0.) THEN
      ICROSS = ISTA
    ENDIF
  ENDDO
  write(6,*) I, hull(I,3)

```

```

C If the last station is out of the water, the entire boat is out.
  IF (ICROSS.EQ.0) THEN
    WTKHEEL = 0.

C If the first station is under water, the entire boat is under.
  ELSEIF (ICROSS.EQ.1) THEN
    WTKHEEL = 18.

C Find the point between the stations.
  ELSE
    I = (ICROSS-1)*5 + 3
    CALL V3LOAD(HULL(I,1), HULL(I,2), HULL(I,3), A)
    I = (ICROSS-2)*5 + 3
    CALL V3LOAD(HULL(I,1), HULL(I,2), HULL(I,3), B)
    CALL XSEG20(A, B, C, ERRFLG)
    IF (ERRFLG) THEN
      WRITE(6,*) 'ASUBTR PROGRAMMING ERROR'
      STOP
    ENDIF
    CALL V3LOAD(HULL(88,1), HULL(88,2), HULL(88,3), B)
    CALL VDIF(B, C, A)
    WTKHEEL = VLEN(A)
  ENDIF

C Find the wetted beam. Measure the beam at the transom. Assume
C it is constant.
  CALL V3LOAD(HULL(86,1), HULL(86,2), HULL(86,3), A)
  CALL V3LOAD(HULL(90,1), HULL(90,2), HULL(90,3), B)
  CALL VDIF(A, B, C)
  WTBEAM = VLEN(C)

C The lateral area will have to wait.
  LTAREA = 0.

  RETURN
  END

C *****
C SUBVOL
C 910811 BAP Find the submerged volume and it's centroid
C *****
  SUBROUTINE SUBVOL(HULL, NPTS, NSTATN, VOLUME, CENTRD, ERRFLG)
  IMPLICIT DOUBLE PRECISION (A-H, O-Z)
  DOUBLE PRECISION HULL(NPTS, 3)
  DOUBLE PRECISION VOLUME
  DOUBLE PRECISION CENTRD(3)
  LOGICAL ERRFLG

  DOUBLE PRECISION A(3), B(3), C(3)
  DOUBLE PRECISION OLD
  DOUBLE PRECISION STACEN(18, 3)
  DOUBLE PRECISION STATN(18)
  DOUBLE PRECISION STATTL

  C write(6,*) 'SUBVOL stub called.'
  IF (NSTATN.GT.18) THEN
    WRITE(6,*) 'ERROR: SUBVOL ARRAY STATN TOO SMALL'
    STOP
  ENDIF

C

```

```

C Find the number of points for each station
  NTRI = NPTS / NSTATN
C
C For each of the stations
  DO ISTA = 1, NSTATN
    STATN(ISTA) = 0.
    STACEN(ISTA, 1) = 0.
    STACEN(ISTA, 2) = 0.
    STACEN(ISTA, 3) = 0.
  C
C Find the area of the submerged part of the station
C For each triangle in the station
  I = (ISTA - 1) * NTRI + 1
  CALL V3LOAD(HULL(I,1), HULL(I,2), HULL(I,3), A)
  DO ITRI = 2, NTRI-1
  C
  C Set up the triangle
    I = (ISTA - 1) * NTRI + ITRI
    CALL V3LOAD(HULL(I,1), HULL(I,2), HULL(I,3), B)
    I = I + 1
    CALL V3LOAD(HULL(I,1), HULL(I,2), HULL(I,3), C)
  C
C The intersection plane is always Z = 0.
C Determine the area of the triangle below the Z = 0. plane
  CALL ASUBTR(A, B, C, AREA, CENTRD)
C
C Sum up the area of the station
  STATN(ISTA) = STATN(ISTA) + AREA
C
C Sum up the moment of the station
  STACEN(ISTA, 1) = STACEN(ISTA, 1) + AREA*CENTRD(1)
  STACEN(ISTA, 2) = STACEN(ISTA, 2) + AREA*CENTRD(2)
  STACEN(ISTA, 3) = STACEN(ISTA, 3) + AREA*CENTRD(3)
  ENDDO
C
C Find the centroid of the station
  IF (STATN(ISTA) .NE. 0.) THEN
    STACEN(ISTA, 1) = STACEN(ISTA, 1) / STATN(ISTA)
    STACEN(ISTA, 2) = STACEN(ISTA, 2) / STATN(ISTA)
    STACEN(ISTA, 3) = STACEN(ISTA, 3) / STATN(ISTA)
  ENDIF
  ENDDO
C
C Find the hull volume from the station areas using Simpson's
  C Formula.
  SUM = 0.
  DO ISTA = 1, NSTATN-1
    IF (MOD(ISTA, 2) .EQ. 1) THEN
      SUM = SUM + 4.0 * STATN(ISTA)
    ELSE
      SUM = SUM + 2.0 * STATN(ISTA)
    ENDIF
  ENDDO
  SUM = SUM + STATN(NSTATN)
  VOLUME = SUM * 1.0 / 3.0
C
C Find the centroid of the hull
  CALL CTROID(18, STATN, STACEN, STATTL, CENTRD)
  RETURN
  END
C*****

```

```

C ASUBTR
C
C 910813 BAP Find the submerged volume and it's centroid
C*****
SUBROUTINE ASUBTR(A, B, C, AREA, CENTRD)
IMPLICIT DOUBLE PRECISION (A-H, O-Z)
DOUBLE PRECISION A(3), B(3), C(3), AREA, CENTRD(3)

DOUBLE PRECISION AB(3), BC(3), CA(3)
LOGICAL ERRFLG
DOUBLE PRECISION PART, CENTPRT(3), TOTAL, CENTTL(3)

C There are eight possible cases:
C
C 7 a,b,c < z=0. 10689 done done
C 6 a,b 0 done done
C 5 a, c 0 done done
C 4 a 0 done done
C 3 b,c 2772 done done
C 2 b 1634 done done
C 1 c 399 done done
C 0 none 760 done done

ICASE = 0
IF (A(3) .LT. 0.) ICASE = ICASE + 4
IF (B(3) .LT. 0.) ICASE = ICASE + 2
IF (C(3) .LT. 0.) ICASE = ICASE + 1

IF (ICASE .EQ. 7) THEN
  CALL AREATR(A, B, C, AREA)
  CALL CENTR(A, B, C, CENTRD)
C
C C is exposed, A and B are submerged.
C **
C B*A
ELSEIF (ICASE .EQ. 6) THEN
  CALL AREATR(A, B, C, TOTAL)
  Find the partial triangle
  CALL XSEG20(B, C, BC, ERRFLG)
  IF (ERRFLG) THEN
    WRITE(6,*) 'ASUBTR PROGRAMMING ERROR'
    STOP
  ENDIF
  CALL XSEG20(C, A, CA, ERRFLG)
  IF (ERRFLG) THEN
    WRITE(6,*) 'ASUBTR PROGRAMMING ERROR'
    STOP
  ENDIF
  CALL AREATR(C, BC, CA, PART)
  AREA = TOTAL - PART
  CALL CENTR(C, BC, CA, CENTPRT)
  CALL CENTR(A, B, C, CENTTL)
  IF (AREA .NE. 0.) THEN
    CENTRD(1) = (CENTTL(1)*TOTAL - CENTPRT(1)*PART) / AREA
    CENTRD(2) = (CENTTL(2)*TOTAL - CENTPRT(2)*PART) / AREA
    CENTRD(3) = (CENTTL(3)*TOTAL - CENTPRT(3)*PART) / AREA
  ENDIF
C*****

```

```

C B
C **
C C*A
C ELSEIF (ICASE.EQ. 5) THEN
  CALL AREATR(A, B, C, TOTAL)
  Find the partial triangle
  CALL XSEGZO(B, C, BC, ERRFLG)
  IF (ERRFLG) THEN
    WRITE(6,*) 'ASUBTR PROGRAMMING ERROR'
    STOP
  ENDIF
ENDIF
CALL XSEGZO(A, B, AB, ERRFLG)
IF (ERRFLG) THEN
  WRITE(6,*) 'ASUBTR PROGRAMMING ERROR'
  STOP
ENDIF
CALL AREATR(B, BC, AB, PART)
AREA = TOTAL - PART
CALL CENTR(B, BC, AB, CENTRT)
CALL CENTR(A, B, C, CENTTL)
IF (AREA.NE. 0.) THEN
  CENTRD(1) = (CENTTL(1)*TOTAL - CENTRT(1)*PART) / AREA
  CENTRD(2) = (CENTTL(2)*TOTAL - CENTRT(2)*PART) / AREA
  CENTRD(3) = (CENTTL(3)*TOTAL - CENTRT(3)*PART) / AREA
ENDIF
C
C *B
C **
C A
C ELSEIF (ICASE.EQ. 4) THEN
  Find the partial triangle
  CALL XSEGZO(A, B, AB, ERRFLG)
  IF (ERRFLG) THEN
    WRITE(6,*) 'ASUBTR PROGRAMMING ERROR'
    STOP
  ENDIF
ENDIF
CALL XSEGZO(A, C, CA, ERRFLG)
IF (ERRFLG) THEN
  WRITE(6,*) 'ASUBTR PROGRAMMING ERROR'
  STOP
ENDIF
CALL AREATR(A, CA, AB, PART)
AREA = PART
CALL CENTR(A, CA, AB, CENTRD)
C
C A
C **
C B*C
C ELSEIF (ICASE.EQ. 3) THEN
  CALL AREATR(A, B, C, TOTAL)
  Find the partial triangle
  CALL XSEGZO(A, B, AB, ERRFLG)
  IF (ERRFLG) THEN
    WRITE(6,*) 'ASUBTR PROGRAMMING ERROR'
    STOP
  ENDIF

```

```

ENDIF
CALL XSEGZO(C, A, CA, ERRFLG)
IF (ERRFLG) THEN
  WRITE(6,*) 'ASUBTR PROGRAMMING ERROR'
  STOP
ENDIF
CALL AREATR(A, AB, CA, PART)
AREA = TOTAL - PART
CALL CENTR(A, AB, CA, CENTRT)
CALL CENTR(A, B, C, CENTTL)
IF (AREA.NE. 0.) THEN
  CENTRD(1) = (CENTTL(1)*TOTAL - CENTRT(1)*PART) / AREA
  CENTRD(2) = (CENTTL(2)*TOTAL - CENTRT(2)*PART) / AREA
  CENTRD(3) = (CENTTL(3)*TOTAL - CENTRT(3)*PART) / AREA
ENDIF
C
C A*C
C **
C B
C ELSEIF (ICASE.EQ. 2) THEN
  Find the partial triangle
  CALL XSEGZO(A, B, AB, ERRFLG)
  IF (ERRFLG) THEN
    WRITE(6,*) 'ASUBTR PROGRAMMING ERROR'
    STOP
  ENDIF
ENDIF
CALL XSEGZO(B, C, BC, ERRFLG)
IF (ERRFLG) THEN
  WRITE(6,*) 'ASUBTR PROGRAMMING ERROR'
  STOP
ENDIF
CALL AREATR(AB, B, BC, PART)
AREA = PART
CALL CENTR(AB, B, BC, CENTRD)
C
C A
C **
C B *
C **C
C ELSEIF (ICASE.EQ. 1) THEN
  CALL XSEGZO(B, C, BC, ERRFLG)
  IF (ERRFLG) THEN
    WRITE(6,*) 'ASUBTR PROGRAMMING ERROR'
    STOP
  ENDIF
ENDIF
CALL XSEGZO(C, A, CA, ERRFLG)
IF (ERRFLG) THEN
  WRITE(6,*) 'ASUBTR PROGRAMMING ERROR'
  STOP
ENDIF
CALL AREATR(BC, C, CA, PART)
AREA = PART
CALL CENTR(BC, C, CA, CENTRD)

```

A and C are exposed, B is submerged.

A and B are exposed, C is submerged.

A is exposed, B and C are submerged.

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```
ELSEIF (ICASE.EQ. 0) THEN
  AREA = 0.
  CALL CENTR(A, B, C, CENTRD)
ENDIF
RETURN
END
```

```

C*****
C REQSUB.f
C 911101 BAP ADAMS REQUEST subroutine.
C*****
SUBROUTINE REQSUB( ID, TIME, PAR, NPAR, IFLAG, RESULT )
IMPLICIT DOUBLE PRECISION (A-H, O-Z)
INTEGER ID
DOUBLE PRECISION TIME
DOUBLE PRECISION PAR( * )
INTEGER NPAR
LOGICAL IFLAG
DOUBLE PRECISION RESULT(8)

C Argument list variable descriptions
C ID Identifier of calling SFORCE statement
C TIME Current time
C PAR Vector of passed statement parameters
C NPAR Number of passed parameters
C IFLAG Initialization pass flag
C RESULT Result array passed back to ADAMS

C Local variables
CHARACTER*4 ACTION
INTEGER ERROR
INTEGER INIT
CHARACTER*80 MESSAGE
DOUBLE PRECISION SUM
DOUBLE PRECISION VECTOR(6)

C Saved variable list
SAVE INIT

C Local variable descriptions
C ACTION Error stop action
C ERROR Error flag
C INIT Local initialization flag
C MESSAGE Error message

C Local variable initialization
DATA ERROR / 0 /
DATA INIT / 0 /

C Initialize local variables
IF (INIT.EQ. 0) THEN
  INIT = 1
  Initialize variable here
  IF (ERROR) THEN
    MESSAGE = 'SFOSUB: Initialization error'
    ACTION = 'STOP'
    CALL ERRMES(.TRUE., MESSAGE, ID, ACTION)
  ENDIF
ENDIF

C Sum up the forces for the Port Gunwhale
SUM = 0.0
DO IDIMKR=20001, 20009
  CALL INFO('FORC', IDIMKR, 3200, 3200, VECTOR, ERRFLG)
  MESSAGE = 'ERROR CALLING INFO FROM H2OSTA'
  CALL ERRMES ( ERRFLG, MESSAGE, ID, ACTSTP)
  SUM = SUM + SQRT( VECTOR(1)*VECTOR(1) +
    1 VECTOR(2)*VECTOR(2) +
    2 VECTOR(3)*VECTOR(3) )
ENDDO
RESULT(4) = SUM
C Sum up all of the impact forces
RESULT(6) = RESULT(2) + RESULT(3) + RESULT(4)
C
RETURN
END

```

```

ENDDO
DO IDIMKR=20010, 200019
  CALL INFO('FORC', IDIMKR, 3200, 3200, VECTOR, ERRFLG)
  MESSAGE = 'ERROR CALLING INFO FROM H2OSTA'
  CALL ERRMES ( ERRFLG, MESSAGE, ID, ACTSTP)
  SUM = SUM + SORT( VECTOR(1)*VECTOR(1) +
    1 VECTOR(2)*VECTOR(2) +
    2 VECTOR(3)*VECTOR(3) )
ENDDO
RESULT(2) = SUM
C Sum up the forces for the Starboard Gunwhale
SUM = 0.0
DO IDIMKR=20001, 20009
  CALL INFO('FORC', IDIMKR, 3300, 3300, VECTOR, ERRFLG)
  MESSAGE = 'ERROR CALLING INFO FROM H2OSTA'
  CALL ERRMES ( ERRFLG, MESSAGE, ID, ACTSTP)
  SUM = SUM + SORT( VECTOR(1)*VECTOR(1) +
    1 VECTOR(2)*VECTOR(2) +
    2 VECTOR(3)*VECTOR(3) )
ENDDO
RESULT(3) = SUM
C Sum up the forces for the Port Chine
SUM = 0.0
DO IDIMKR=20001, 20009
  CALL INFO('FORC', IDIMKR, 3400, 3400, VECTOR, ERRFLG)
  MESSAGE = 'ERROR CALLING INFO FROM H2OSTA'
  CALL ERRMES ( ERRFLG, MESSAGE, ID, ACTSTP)
  SUM = SUM + SORT( VECTOR(1)*VECTOR(1) +
    1 VECTOR(2)*VECTOR(2) +
    2 VECTOR(3)*VECTOR(3) )
ENDDO
RESULT(4) = SUM
C Sum up all of the impact forces
RESULT(6) = RESULT(2) + RESULT(3) + RESULT(4)
C
RETURN
END

```



```

C*****
C SFMAIN.f
C 2 Aug 90
C B A Pendock
C
C Checking routine for SFOSUB
C*****
C IMPLICIT DOUBLE PRECISION (A-H, O-Z)
C
C INCLUDE 'TEST.com'
C*****
C TEST.com
C 3 Aug 90
C B A Pendock
C
C Common block for testing user SFORCE routines.
C*****
COMMON /TEST/ ERROR
INTEGER ERROR
C
C Parameter definitions
INTEGER NPAR
PARAMETER ( NPAR = 2 )
PARAMETER ( NSFOID = 1 )
PARAMETER ( NSFOID = 6 )
C
C
C
C Here is a list of SFORCE ID's to try
INTEGER SFID(NSFOID)
DOUBLE PRECISION PAR1(NSFOID)
DOUBLE PRECISION PAR2(NSFOID)
INTEGER ISFID
INTEGER NSFID
C
C Argument list variable descriptions
C ID Identifier of calling SFORCE statement
C TIME Current time
C PAR Vector of passed statement parameters
C NPAR Number of passed parameters
C DFLAG Differencing flag
C IFLAG Initialization pass flag
C VALUE The SFORCE value returned to ADAMS
C
DATA ID / 1 /
DATA TIME / 0. /
DATA DFLAG / .FALSE. /
DATA NSFID / NSFOID /
C
DATA SFID / 1001, 1002, 1003, 1004, 1005, 1006 /
C
DATA PAR1 / 1000, 1000, 1000, 1000, 1000, 1000 /
C
DATA PAR2 / 1001, 1002, 1003, 1001, 1002, 1003 /
C
DATA SFID / 2001 /
DATA PAR1 / 2000 /
DATA PAR2 / 2001 /
C
C Initialization
IFLAG = .TRUE.
ISFID = 0
10 IF (ERROR.EQ. 0 .AND. ISFID.LT. NSFID) THEN

```

```

ISFID = ISFID + 1
ID = SFID(ISFID)
PAR(1) = PAR1(ISFID)
PAR(2) = PAR2(ISFID)
CALL SFOSUB( ID, TIME, PAR, NPAR, DFLAG, IFLAG, VALUE )
IFLAG = .FALSE.
GO TO 10
ENDIF

C First time point
IFLAG = .FALSE.
ISFID = 0
20 IF (ERROR.EQ. 0 .AND. ISFID.LT. NSFID) THEN
    ISFID = ISFID + 1
    ID = SFID(ISFID)
    CALL SFOSUB( ID, TIME, PAR, NPAR, DFLAG, IFLAG, VALUE )
    GO TO 20
ENDIF

C Check the status
WRITE(6,*) 'Run complete status =', ERROR
C
C STOP
C END

C*****
C STUBS.f
C 2 Aug 90
C B A Pendock
C
C This file contains all of the stubs needed to resolve the link. This
C file should not be used to generate production code.
C*****
C*****
C*****
C Error message stub.
C*****
SUBROUTINE ERRMES(ERRFLG, MSG, ID, ACTION)
LOGICAL ERRFLG
CHARACTER*80 MSG
INTEGER ID
CHARACTER*4 ACTION
C
C INCLUDE 'TEST.com'
C*****
C TEST.com
C 3 Aug 90
C B A Pendock
C
C Common block for testing user SFORCE routines.
C*****
COMMON /TEST/ ERROR
INTEGER ERROR
C
WRITE(6,*) 'ERRMES STUB CALLED'
WRITE(6,*) 'ERRFLG =', ERRFLG
WRITE(6,*) 'MSG =', MSG
WRITE(6,*) 'ID =', ID
WRITE(6,*) 'ACTION =', ACTION
C

```

```

      IF (ERRFLG) THEN
        ERROR = 1
      ENDIF
    C
    C RETURN
    C END
  C*****
  C FNCDEP
  C 10 Aug 90
  C B A Pendock
  C
  C Functional dependency stub.
  C*****
  SUBROUTINE FNCDEP (SUBNAM, VARNAM, ID, ARRAY, N, ERRFLG)
  CHARACTER*6 SUBNAM
  CHARACTER*6 VARNAM
  INTEGER ID
  DOUBLE PRECISION ARRAY(*)
  INTEGER N
  LOGICAL ERRFLG
  C
  WRITE(6,*) 'FNCDEP STUB CALLED'
  WRITE(6,*) 'SUBNAM=', SUBNAM, ', VARNAM=', VARNAM, ', ID=', ID
  IF (N .GT. 0) THEN
    WRITE(6, '(6I10)') (INT(ARRAY(I)), I=1, N)
  ENDIF
  C
  C ERRFLG = .FALSE.
  C
  C RETURN
  C END
  C*****
  C 14 Aug 90
  C B A Pendock
  C
  C Info stub.
  C*****
  SUBROUTINE INFO (TYPE, IDIMKR, IDJMKR, IDRMKR, ARRAY, ERRFLG)
  CHARACTER*4 TYPE
  INTEGER IDIMKR
  INTEGER IDJMKR
  INTEGER IDRMKR
  DOUBLE PRECISION ARRAY(6)
  LOGICAL ERRFLG
  C
  WRITE(6,910) 'INFO stub called', TYPE, IDIMKR, IDJMKR, IDRMKR
  910 FORMAT(1x, a16, ' type=', a4, ', i=', i6, ', j=', i6, ', r=', i6)
  DO 10 I = 1, 6
    ARRAY(I) = 0.
  10 CONTINUE
  ERRFLG = .FALSE.
  C
  C RETURN
  C END
  C*****
  C RCNVRT
  C 6 Sep 90
  C B A Pendock
  C
  C Stub for subroutine that converts angles.
  C*****
  SUBROUTINE RCNVRT (SYS1, COORD1, SYS2, COORD2, ISTAT)
  CHARACTER*7 SYS1

```

```

    DOUBLE PRECISION COORD1(*)
    CHARACTER*7 SYS2
    DOUBLE PRECISION COORD2(*)
    INTEGER ISTAT
  C
  WRITE(6,910) 'RCNVRT stub called', SYS1, (COORD1(I), I=1,3),
    & SYS2, (COORD2(I), I=1,3), ISTAT
  910 FORMAT(1x, a18, ' SYS1=', a7, ', COORD1=', 3F10.4, ',
    & /, 21x, 'SYS2=', a7, ', COORD2=', 3F10.4, ',
    & /, 21x, 'ISTAT=', i3)
  DO 10 I = 1, 3
    COORD2(I) = 0.
  10 CONTINUE
  ISTAT = 0
  C
  C RETURN
  C END

```

```

C*****
C SFOSUB.i
C 91080 BAP ADAMS SFORCE subroutine.
C*****
SUBROUTINE SFOSUB( ID, TIME, PAR, NPAR, DFLAG, IFLAG, VALUE )
IMPLICIT DOUBLE PRECISION (A-H, O-Z)
INTEGER ID
DOUBLE PRECISION TIME
DOUBLE PRECISION PAR( * )
INTEGER NPAR
LOGICAL DFLAG
LOGICAL IFLAG
DOUBLE PRECISION VALUE

C Argument list variable descriptions
C ID Identifier of calling SFORCE statement
C TIME Current time
C PAR Vector of passed statement parameters
C NPAR Number of passed parameters
C DFLAG Differencing flag
C IFLAG Initialization pass flag
C VALUE The SFORCE value returned to ADAMS

C Local variables
CHARACTER*4 ACTION
INTEGER ERROR
INTEGER INIT
INTEGER MESSAGE
INTEGER SUBID
INTEGER SFSUB

C Saved variable list
SAVE INIT

C Local variable descriptions
C ACTION Error stop action
C ERROR Error flag
C INIT Local initialization flag
C MESSAGE Error message
C SUBID Code for which subroutine should be called.
C 0 - Unknown
C 1 - H2OSTA Hydro-static forces
C 2 - H2ODYN Hydro-dynamic forces
C 3 - CRASH Impact forces

C Local variable initialization
DATA ERROR / 0 /
DATA INIT / 0 /

C Initialize local variables
IF (INIT.EQ. 0) THEN
  INIT = 1
  Initialize variable here
  IF (ERROR) THEN
    MESSAGE = 'SFOSUB: Initialization error'
    ACTION = 'STOP'
    CALL ERMES(.TRUE., MESSAGE, ID, ACTION)
  ENDIF
ENDIF

C Primary routing
SUBID = SFOSUB(ID)
C*****

```

```

C The SFORCE was not identified
IF (SUBID.EQ. 0) THEN
  MESSAGE = 'SFOSUB: Unknown SFORCE ID'
  ACTION = 'STOP'
  CALL ERMES(.TRUE., MESSAGE, ID, ACTION)
C
C Call the hydro-statics routine
ELSEIF (SUBID.EQ. 1) THEN
  CALL H2OSTA(ID, TIME, PAR, NPAR, IFLAG, VALUE)
C
C Call the hydro-dynamics routine
ELSEIF (SUBID.EQ. 2) THEN
  CALL H2ODYN(ID, TIME, PAR, NPAR, DFLAG, IFLAG, VALUE)
C
C Call the crash routine
ELSEIF (SUBID.EQ. 3) THEN
  CALL CRASH(ID, TIME, PAR, NPAR, DFLAG, IFLAG, VALUE)
  ENDIF
C
  RETURN
  END
C*****
C SFOSUB
C 910808 BAP Find the function that needs to be called for the
C given SFORCE.
C 0 - Unknown
C 1 - H2OSTA Hydro-static forces
C 2 - H2ODYN Hydro-dynamic forces
C 3 - CRASH Impact forces
C*****
C INTEGER FUNCTION SFOSUB(ID)
C INTEGER ID
C
  IF (ID.EQ. 2001.OR. ID.EQ. 3001 .OR.
    2 ID.EQ. 2002 .OR. ID.EQ. 3002 .OR.
    3 ID.EQ. 2003 .OR. ID.EQ. 3003 .OR.
    4 ID.EQ. 2004 .OR. ID.EQ. 3004 .OR.
    5 ID.EQ. 2005 .OR. ID.EQ. 3005 .OR.
    6 ID.EQ. 2006 .OR. ID.EQ. 3006 ) THEN
    SFOSUB = 1
  ELSE IF (ID.EQ. 2101 .OR.
    2 ID.EQ. 2102 .OR.
    3 ID.EQ. 2103 .OR.
    4 ID.EQ. 2104 .OR.
    5 ID.EQ. 2105 .OR.
    6 ID.EQ. 2106 ) THEN
    SFOSUB = 2
  ELSE IF (ID.GE. 3200 .AND. ID.LE. 3220 .OR.
    2 ID.GE. 3300 .AND. ID.LE. 3320 .OR.
    3 ID.GE. 3400 .AND. ID.LE. 3420 ) THEN
    SFOSUB = 3
  ELSE
    SFOSUB = 0
  ENDIF
C
  RETURN
  END
C*****
C H2OSTA
C 910808 BAP Find the hydro-static forces.
C*****
SUBROUTINE H2OSTA(ID, TIME, PAR, NPAR, IFLAG, VALUE)

```

```

C Find the force
C freshwater = 62.4
C seawater = 64.0

BUO(1) = 0.
BUO(2) = 0.
BUO(3) = volume * 64.0

C
C Find the torques in the boat frame
IF (ID.EQ.2001.OR.ID.EQ.3001) THEN
  VALUE = BUO(3)
ELSEIF (ID.EQ.2004.OR.ID.EQ.3004) THEN
  CALL VDIF(CENTRD, NEWCM, ARM)
  CALL VCERS(ARM, BUO, TRQ)
  VALUE = TRQ(1)
ELSEIF (ID.EQ.2005.OR.ID.EQ.3005) THEN
  CALL VDIF(CENTRD, NEWCM, ARM)
  CALL VCERS(ARM, BUO, TRQ)
  VALUE = TRQ(2)
ELSE
  WRITE(6,*) 'UNKNOWN ID', ID
ENDIF
ENDIF
RETURN
END
C*****
C H2ODYN
C 910829 BAP Find the hydro-dynamic forces.
C*****
SUBROUTINE H2ODYN(ID, TIME, PAR, NPAR, DFLAG, IFLAG, VALUE)
IMPLICIT DOUBLE PRECISION (A-H, O-Z)
INTEGER ID
DOUBLE PRECISION TIME
DOUBLE PRECISION PAR( *)
INTEGER NPAR
LOGICAL DFLAG
LOGICAL IFLAG
DOUBLE PRECISION VALUE

CHARACTER*4 ACTSTP
LOGICAL ERRFLG
CHARACTER*80 MESSAGE
DOUBLE PRECISION CENTRD(3)
DOUBLE PRECISION REF(3)
DOUBLE PRECISION G, RHO, B, V, T, LAMBDA, BETA
DOUBLE PRECISION WTKEL, WTBEAM, LTAREA
DOUBLE PRECISION VECTOR(6)

DOUBLE PRECISION EA(3), YPR(3)
INTEGER ISTAT
DATA ACTSTP /'STOP'/

WRITE(6,*) 'H2ODYN CALLED'
write(6,*) ' id=', id
write(6,*) ' npar=', npar
write(6,*) ' par=', (par(i), i=1, npar)
write(6,*) ' dflag=', dflag
write(6,*) ' iflag=', iflag
IF (IFLAG) THEN

```

```

C
C Find the dynamic lift ...
ELSE
C 1. CV      CV = V / ( G * B ) ** 0.5
C 2. CLO      CLO = T**1.1 *
              ( 0.012*LAMBDA**0.5 + 0.0055*LAMBDA**2.5 / CV**2.)
C 3. CLB      CLB = CLO - 0.0065*BETA*CLO**0.60
C 4. delta d  DELTAD = 0.5 * RHO * V*V * B*B * CLO * CLB

C Find the mass center current position
G = 32.2
RHO = 1.9384
REF(1) = PAR(3)
REF(2) = PAR(4)
REF(3) = PAR(5)
B = PAR(6)
V = PAR(7)
T = PAR(8)
LAMBDA = PAR(9)
BETA = PAR(10)

C Find an instantaneous lambda.
IDIMKR = PAR(1)

C Get the mass center current position
CALL INFO('DISP', IDIMKR, 100, 100, VECTOR, ERRFLG)
MESSAGE = 'ERROR CALLING INFO FROM H2ODYN'
CALL ERRMES ( ERRFLG, MESSAGE, ID, ACTSTP)

C Use the hullgm routine to find submerged volume and its centroid
2
CALL HULLGM(REF, VECTOR, VOLUME, CENTRD, WTKEEL, WTBEAM,
            LTAREA, ERRFLG)
lambda = wtkeel / wtbeam
write(6,*) 'new lamda =', wtkeel/wtbeam

C Find the instantaneous trim angle
C Note: This code needs more work. The trim angle code works
C okay but the rest of the system prevents the bow from
C coming up, so that the system can't get started. For
C now, let the trim angle stay an input.
CALL V3LOAD(VECTOR(4), VECTOR(5), VECTOR(6), EA)
CALL RCNVRT('EULER', EA, 'YPR', YPR, ISTAT)
IF (ISTAT.NE.0) THEN
  ERRFLG = .TRUE.
  MESSAGE = 'ERROR CALLING RCNVRT FROM H2ODYN'
  CALL ERRMES ( ERRFLG, MESSAGE, ID, ACTSTP)
ENDIF
IF (YPR(2) .LT. 0.) THEN
  T = - YPR(2) * 180. / 3.1415
ELSE
  T = 0.
ENDIF

C Use a minimum trim angle to get the bow up.
IF (T .LT. 2.0) THEN
  T = 2.0
ENDIF
write(6,*) 'pitch,t=', ypr(2), t

```

```

C 1. CV      CV = V / ( G * B ) ** 0.5
C 2. CLO      CLO = T**1.1 *
              ( 0.012*LAMBDA**0.5 + 0.0055*LAMBDA**2.5 / CV**2.)
C 3. CLB      CLB = CLO - 0.0065*BETA*CLO**0.60
C 4. delta d  DELTAD = 0.5 * RHO * V*V * B*B * CLO * CLB

C Find the center of dynamic lift forward of the transom
CP = 0.75 - 1. / ( 5.21 * CV**2 / LAMBDA**2 + 2.39)
CENTER = CP * B * LAMBDA

C Find the torque. The CM is 11.511' from the bow. The
C transom is 18' from the bow. So the CM is 6.489 ahead of the
C transom.
C New CM at ref(1), ref(2), ref(3)
VALUE = (CENTER - (18.0 - ref(1))) * DELTAD
ELSE VALUE = 0.
ENDIF
ENDIF
RETURN
END
C*****
C CRASH
C 910903 BAP Find the impact forces.
C*****
SUBROUTINE CRASH(ID, TIME, PAR, NPAR, DFLAG, IFLAG, VALUE)
IMPLICIT DOUBLE PRECISION (A-H, O-Z)
INTEGER ID
DOUBLE PRECISION TIME
DOUBLE PRECISION PAR( * )
INTEGER NPAR
LOGICAL DFLAG
LOGICAL IFLAG
DOUBLE PRECISION VALUE
CHARACTER*4 ACTSTP
DOUBLE PRECISION CMAX
DOUBLE PRECISION D
DOUBLE PRECISION DIFF(3)
DOUBLE PRECISION E
LOGICAL ERRFLG
DOUBLE PRECISION FBREAK
DOUBLE PRECISION FMAG(3)
LOGICAL IBREAK, ibmsg
INTEGER IDIMKR, IDJMKR, IDRMKR
integer init
INTEGER IORD
DOUBLE PRECISION K
CHARACTER*80 MESSAGE
DOUBLE PRECISION VECTOR(6)
DOUBLE PRECISION X, XD, XI

```

```

C
C Saved variable list
SAVE IBREAK, init, ibmsg

DATA ACTSTP /'STOP'/
DATA IBREAK /.FALSE./
data ibmsg /.false./

IDIMKR = PAR(1)
IDJMKR = PAR(2)
X1 = PAR(3)
K = PAR(4)
E = PAR(5)
CMAX = PAR(6)
D = PAR(7)
FBREAK = PAR(8)

IF (IFLAG) THEN
  VALUE = 0.
ELSE
  C Find the distance from the i and j markers.
  C Ignore the y distance
  CALL INFO('DISP', IDIMKR, IDJMKR, 100, VECTOR, ERRFLG)
  MESSAGE = 'ERROR CALLING INFO FROM CRASH'
  CALL ERRMES ( ERRFLG, MESSAGE, ID, ACTSTP)
  DIFF(1) = VECTOR(1)
  DIFF(2) = 0.
  DIFF(3) = VECTOR(3)

  X = VLEN(DIFF)

  C
  C If the bow of the bullet boat is more than 5 ft away from the target
  C boat in the x direction, return zero forces.
  if ( diff(1) .gt. 5 ) then
    VALUE = 0.
  else
    C Find the velocity from the i and j markers.
    C Ignore the y distance
    CALL INFO('VEL', IDIMKR, IDJMKR, 100, VECTOR, ERRFLG)
    MESSAGE = 'ERROR CALLING INFO FROM CRASH'
    CALL ERRMES ( ERRFLG, MESSAGE, ID, ACTSTP)
    DIFF(1) = VECTOR(1)
    DIFF(2) = 0.
    DIFF(3) = VECTOR(3)

    XD = -VLEN(DIFF)

    C Find the impact force....
    IORD = 0

    CALL IMPACT(X, XD, X1, K, E, CMAX, D, IORD, FMAG, ERRFLG)
    MESSAGE = 'ERROR CALLING IMPACT FROM CRASH'
    CALL ERRMES ( ERRFLG, MESSAGE, ID, ACTSTP)

    C
    C Check for exceeding the breaking point.
    IF (ID .GE. 3200 .AND. ID .IE. 3220) THEN
      IF (FMAG(1) .GT. FBREAK) THEN
        IBREAK = .TRUE.
      ENDIF
    ENDIF
  ENDIF
ENDIF
  VALUE = FMAG(1)
ENDIF
ENDIF

if (ibreak .and. (ibmsg .eq. .false.)) then
  write(6,*) 'broken id, time=', id, time
  ibmsg = .true.
endif
RETURN
END

```

```

C*****
C AREATR
C
C 910813 BAP Find the area of a triangle in three space.
C*****
SUBROUTINE AREATR(VA, VB, VC, AREA)
DOUBLE PRECISION VA(3), VB(3), VC(3), AREA
DOUBLE PRECISION A(3), B(3), C(3)
DOUBLE PRECISION S, SA, SB, SC
C Find the sides of the triangle
CALL VDIFF(VA, VB, A)
CALL VDIFF(VB, VC, B)
CALL VDIFF(VC, VA, C)
C Find the length of the sides
SA = VLEN(A)
SB = VLEN(B)
SC = VLEN(C)
C Find the circumference of the triangle
S = 0.5 * ( SA + SB + SC )
C Find the area of the triangle
AREA = SQRT( S * ( S - SA ) * ( S - SB ) * ( S - SC ) )
RETURN
END
C*****
C CENTR
C
C 910816 BAP Find the centroid of a triangle in three space.
C*****
SUBROUTINE CENTR(A, B, C, CENTER)
DOUBLE PRECISION A(3), B(3), C(3), CENTER(3)
DO I = 1, 3
CENTER(I) = ( A(I) + B(I) + C(I) ) / 3.
ENDDO
RETURN
END
C*****
C CTROID
C
C 910816 BAP Find the moment of a system in three space.
C*****
SUBROUTINE CTROID(N, AREA, V, TOTAL, CENTER)
INTEGER N
DOUBLE PRECISION AREA(N), V(N, 3), TOTAL, CENTER(3)
DOUBLE PRECISION SUM
TOTAL = 0.
DO I = 1, N
TOTAL = TOTAL + AREA(I)
ENDDO
IF (TOTAL.NE. 0.) THEN
DO IAXIS = 1, 3
SUM = 0.
DO I = 1, N
SUM = SUM + AREA(I) * V(I, IAXIS)

```

```

ENDDO
CENTER(IAXIS) = SUM / TOTAL
ENDIF
ENDDO
RETURN
END
C*****
C MPRINT
C
C 910811 BAP Print a 4x4 matrix.
C*****
SUBROUTINE MPRINT(M)
DOUBLE PRECISION M(4,4)
DO I=1,4
WRITE(6,'(1X, 4F10.4)') (M(I,J), J=1,4)
ENDDO
RETURN
END
C*****
C MCOPY
C
C 910811 BAP Copy a 4x4 matrix.
C*****
SUBROUTINE MCOPY(DEST, SRC)
DOUBLE PRECISION DEST(4,4), SRC(4,4)
DO I=1,4
DO J=1,4
DEST(I,J) = SRC(I,J)
ENDDO
END
RETURN
END
C*****
C MIDENT
C
C 910811 BAP Print a 4x4 matrix.
C*****
SUBROUTINE MIDENT(M)
DOUBLE PRECISION M(4,4)
DO I=1,4
DO J=1,4
IF (I.EQ. J) THEN
M(I,J) = 1.0
ELSE
M(I,J) = 0.0
ENDIF
ENDDO
END
RETURN
END
C*****
C MMUL
C
C 910811 BAP Multiple two 4x4 matrices.
C*****
SUBROUTINE MMUL(A, B)
DOUBLE PRECISION A(4,4), B(4,4)

```

```
DOUBLE PRECISION C(4,4)
DOUBLE PRECISION R
```

```
DO I=1,4
  DO J=1,4
    R = 0.0
    DO K=1,4
      R = R + A(I, K) * B(K, J)
    ENDDO
    C(I, J) = R
  ENDDO
ENDDO
```

```
CALL MCOPI(B, C)
```

```
RETURN
END
```

```
C*****
C MROTAT
```

```
C 910811 BAP Form a rotation matrix.
```

```
C*****
SUBROUTINE MROTAT(T, A, M)
```

```
DOUBLE PRECISION T
CHARACTER*1 A
DOUBLE PRECISION M(4,4)
```

```
DOUBLE PRECISION CT
DOUBLE PRECISION R(4,4)
DOUBLE PRECISION ST
```

```
CT = COS(T)
ST = SIN(T)
```

```
CALL MIDENT(R)
```

```
IF (A.EQ.'X'.OR.A.EQ.'x') THEN
  R(2,2) = CT
  R(2,3) = ST
  R(3,2) = -ST
  R(3,3) = CT
ELSEIF (A.EQ.'Y'.OR.A.EQ.'y') THEN
  R(1,1) = CT
  R(1,3) = -ST
  R(3,1) = ST
  R(3,3) = CT
ELSEIF (A.EQ.'Z'.OR.A.EQ.'z') THEN
  R(1,1) = CT
  R(1,2) = ST
  R(2,1) = -ST
  R(2,2) = CT
ELSE
  WRITE(6,*) 'MROTAT: BAD AXIS ',A
ENDIF
```

```
CALL MMUL(R, M)
```

```
RETURN
END
```

```
C*****
C MTRANS
```

```
C 910811 BAP Form a translation matrix.
```

```
C*****
SUBROUTINE MTRANS(X, Y, Z, M)
DOUBLE PRECISION X, Y, Z
DOUBLE PRECISION M(4,4)
```

```
DOUBLE PRECISION R(4,4)
```

```
CALL MIDENT(R)
```

```
R(4,1) = X
R(4,2) = Y
R(4,3) = Z
```

```
CALL MMUL(R, M)
```

```
RETURN
END
```

```
C*****
C MMUL_P
```

```
C 910811 BAP Multiple 1x4 matrix by a 4x4 matrix.
```

```
C*****
SUBROUTINE MMUL_P(P, M)
```

```
DOUBLE PRECISION P(4), M(4,4)
```

```
DOUBLE PRECISION C(4)
```

```
DOUBLE PRECISION R
```

```
DO J=1,4
```

```
R = 0.0
```

```
DO K=1,4
```

```
R = R + P(K) * M(K, J)
```

```
ENDDO
```

```
C(J) = R
```

```
ENDDO
```

```
DO J=1,4
```

```
P(J) = C(J)
```

```
ENDDO
```

```
RETURN
```

```
END
```

```
C*****
C M4LOAD
```

```
C 910811 BAP Load a 1x4 matrix.
```

```
C*****
SUBROUTINE M4LOAD(X, Y, Z, M4)
```

```
DOUBLE PRECISION X, Y, Z, M4(4)
```

```
M4(1) = X
```

```
M4(2) = Y
```

```
M4(3) = Z
```

```
M4(4) = 1.0
```

```
RETURN
```

```
END
```

```
C*****
C M4GET
```

```
C 910811 BAP Get a 1x4 matrix.
```

```
C*****
SUBROUTINE M4GET(X, Y, Z, M4)
```

```
DOUBLE PRECISION X, Y, Z, M4(4)
```



```

X = M4(1)
Y = M4(2)
Z = M4(3)

```

```

RETURN
END

```

```

C *****
C VDIFF

```

```

C 910813 BAP Vector difference.
C *****

```

```

SUBROUTINE VDIFF(A, B, C)

```

```

DOUBLE PRECISION A(3), B(3), C(3)

```

```

C(1) = A(1) - B(1)
C(2) = A(2) - B(2)
C(3) = A(3) - B(3)

```

```

RETURN
END

```

```

C *****
C VSUM

```

```

C 910813 BAP Vector sum.
C *****

```

```

SUBROUTINE VSUM(A, B, C)

```

```

DOUBLE PRECISION A(3), B(3), C(3)

```

```

C(1) = A(1) + B(1)
C(2) = A(2) + B(2)
C(3) = A(3) + B(3)

```

```

RETURN
END

```

```

C *****
C VCOP

```

```

C 910813 BAP Vector copy.
C *****

```

```

SUBROUTINE VCOP(A, B)

```

```

DOUBLE PRECISION A(3), B(3)

```

```

A(1) = B(1)
A(2) = B(2)
A(3) = B(3)

```

```

RETURN
END

```

```

C *****
C VCRS

```

```

C 910813 BAP Vector cross product.
C *****

```

```

SUBROUTINE VCRS(A, B, C)

```

```

DOUBLE PRECISION A(3), B(3), C(3)

```

```

C(1) = A(2) * B(3) - B(2) * A(3)
C(2) = A(3) * B(1) - B(3) * A(1)
C(3) = A(1) * B(2) - B(1) * A(2)

```

```

RETURN
END

```

```

C *****

```

```

C VNORM

```

```

C

```

```

C 910813 BAP Vector normalize.

```

```

C *****
SUBROUTINE VNORM(A)

```

```

DOUBLE PRECISION A(3)

```

```

DOUBLE PRECISION MAG

```

```

MAG = SORT( A(1)*A(1) + A(2)*A(2) + A(3)*A(3) )
IF (MAG .GT. 0.) THEN

```

```

A(1) = A(1) / MAG

```

```

A(2) = A(2) / MAG

```

```

A(3) = A(3) / MAG

```

```

ELSE

```

```

WRITE(6,*) 'VNORM: VECTOR HAS ZERO MAGNITUDE'

```

```

ENDIF

```

```

RETURN

```

```

END

```

```

C *****
C VLEN

```

```

C

```

```

C 910813 BAP Vector length.
C *****

```

```

FUNCTION VLEN(A)

```

```

DOUBLE PRECISION A(3)

```

```

VLEN = SORT( A(1)*A(1) + A(2)*A(2) + A(3)*A(3) )

```

```

RETURN

```

```

END

```

```

C *****
C V3LOAD

```

```

C

```

```

C 910813 BAP Load a three dimensional vector.
C *****

```

```

SUBROUTINE V3LOAD(X, Y, Z, V3)

```

```

DOUBLE PRECISION X, Y, Z, V3(3)

```

```

V3(1) = X

```

```

V3(2) = Y

```

```

V3(3) = Z

```

```

RETURN

```

```

END

```

```

C *****
C V3GET

```

```

C

```

```

C 910813 BAP Get a three dimensional vector.
C *****

```

```

SUBROUTINE V3GET(X, Y, Z, V3)

```

```

DOUBLE PRECISION X, Y, Z, V3(3)

```

```

X = V3(1)

```

```

Y = V3(2)

```

```

Z = V3(3)

```

```

RETURN

```

```

END

```

```

C *****
C XFORM

```

```

C

```

```

C 910811 BAP Transform the geometry list.
C *****

```

```

C*****
SUBROUTINE XFORM(ARYINI, A, NPTS, VECTOR, ERRFLG)
IMPLICIT DOUBLE PRECISION (A-H, O-Z)
DOUBLE PRECISION ARYINI(NPTS, 3)
DOUBLE PRECISION ANPTS, 3)
DOUBLE PRECISION VECTOR(6)
LOGICAL
ERRFLG
DOUBLE PRECISION M4(4)
DOUBLE PRECISION MAT(4,4)

C Copy the array
DO I = 1, NPTS
  A(I, 1) = ARYINI(I, 1)
  A(I, 2) = ARYINI(I, 2)
  A(I, 3) = ARYINI(I, 3)
ENDDO

C Build the transformation matrix
C Initialize the matrix
CALL MIDENT(MAT)

C Translate
IF (VECTOR(1) .NE. 0. .OR.
  1 VECTOR(2) .NE. 0. .OR.
  2 VECTOR(3) .NE. 0. ) THEN
  CALL MTRANS(VECTOR(1), VECTOR(2), VECTOR(3), MAT)
ENDIF

C Rotate Z
IF (VECTOR(4) .NE. 0.) THEN
  CALL MROTAT(VECTOR(4), 'Z', MAT)
ENDIF

C Rotate X
IF (VECTOR(5) .NE. 0.) THEN
  CALL MROTAT(VECTOR(5), 'X', MAT)
ENDIF

C Rotate Z
IF (VECTOR(6) .NE. 0.) THEN
  CALL MROTAT(VECTOR(6), 'Z', MAT)
ENDIF

C Transform each of the points
DO I = 1, NPTS
  CALL M4LOAD(A(I, 1), A(I, 2), A(I, 3), M4)
  CALL MMUL_P(M4, MAT)
  CALL M4GET(A(I, 1), A(I, 2), A(I, 3), M4)
ENDDO

RETURN
END
C*****

C XSEGZO
C 910814 BAP Find the intersection of the z=0. plane and a line
C segment
C*****
SUBROUTINE XSEGZO(A, B, C, ERRFLG)
DOUBLE PRECISION A(3), B(3), C(3)

```

```

LOGICAL ERRFLG

```

```

DOUBLE PRECISION M(3), T

```

```

ERRFLG = .FALSE.

```

```

C Find the vector difference
CALL VDIF(A, B, M)

```

```

IF (M(3) .NE. 0.) THEN

```

```

C Find the unique intersection point of the line passing through
C AB and the z=0. plane.

```

```

T = -A(3) / M(3)
C(1) = M(1) * T + A(1)
C(2) = M(2) * T + A(2)
C(3) = M(3) * T + A(3)

```

```

ELSE

```

```

IF ( (A(1) .EQ. B(1)) .AND.
  1 (A(2) .EQ. B(2)) .AND.
  2 (A(3) .EQ. B(3)) .AND.
  3 (A(3) .EQ. 0. ) ) THEN

```

```

C If the two points are identical and at z=0. then there is a
C unique solution. Leave the error flag false.
ELSE

```

```

C The line segment AB is parallel to the z=0. plane and there is
C either no solution or an infinite number of solutions.
ERRFLG = .TRUE.
ENDIF

```

```

ENDIF

```

```

C(1) = A(1)
C(2) = A(2)
C(3) = A(3)

```

```

ENDIF

```

```

RETURN

```

```

END

```

## **APPENDIX C**

### **ADAMS - Data Set for the 30 MPH Collision**

Boat 30 mph

! boat.adm

! 910808 BAP Simple boat model for testing the SFOSUB.

! 1 mph = 1.4667 fps

! 5 mph = 7.3 fps

! 10 mph = 14.7 fps

! 15 mph = 22.0 fps

! 20 mph = 29.3 fps

! 25 mph = 36.7 fps

! 30 mph = 44.0 fps

! static, t=0.0, CM = 11.770, 0., 0.75

! static, t=0.0, ref = 11.770, 0., 2.00

! 5 mph, t=0.0, ref = 11.770

! 10 mph, t=9.5, ref = 14.150

! 15 mph, t=6.9, ref = 13.520

! 20 mph, t=5.2, ref = 13.100

! 25 mph, t=5.0, ref = 12.950

! 30 mph, t=5.0, ref = 12.850

! Hull reference frame has the keel at x=0, y=0 and z=0.

! To move the CM within the boat, move the CM and ref.

! To move the entire boat, move the CM, and graphics reference.

! Changing speeds involves moving the CM within the boat and moving

! the entire boat.

! It takes about 3 sec for the boat to trim.

output/ grsave, reqsave, ypr

accgrav/ gc=32.2, kgrav=-32.2

gstiff/ err=.001

! ground (water)

part/100, ground

marker/100

gr/100, cir, cm=100, rad=200

! boat

part/200, cm=200, ma=4868, ip=50000,156000,156000

, vx= -44.0, wy=.001

marker/200 , qp=132.850, 0.0, 0.75

marker/201 , qp=120.000, 0.0, -1.25

marker/200100 , qp=132.850, 0.0, 0.75

marker/100200 , qp=132.850, 0.0, 0.75, pa=100

marker/1002001, pa=100

marker/1002004, reu= 90D, 0, pa=100

marker/1002005, reu= 0, -90D, 0, pa=100

marker/1002102, reu= 0, -90D, 0, pa=100

marker/1002103, pa=100

marker/1002202, reu= 0, -90D, 0, pa=100

! constrain boats to 3 dof

jo/100, plan, i=102, j=202  
 ma/102, pa=100, qp=132.850, 0.0, 0.75  
 reu=0, 90d, 0  
 ma/202, pa=200, qp=132.850, 0.0, 0.75  
 reu=0, 90d, 0

! guess at the damping

bushing/200, i=200, j=100

, c= 0, 100, 1000

! fore, lat, vert

, ct= 10000, 100000, 100000

! roll, pitch, yaw

! buoyancy

sfo/2001, i=200100, j=1002001, tra, action

, fu=user(200100, 100200, 12.850, 0., 2.00)

! ^ boat cm

sfo/2004, i=200100, j=1002004, rot, action

, fu= user(200100, 100200, 12.850, 0., 2.00)

sfo/2005, i=200100, j=1002005, rot, action

, fu= user(200100, 100200, 12.850, 0., 2.00)

! dynamic lift

! b est 3.1 beam at waterline

, v -7.333 forward velocity in f/s

, t 0 trim angle in radians

! lambda est 5.161 wetted keel len / wetted beam len

! Note: currently lambda is not used.

! beta 0.1686 18' dead rise angle in radians

! b, v, t, lambda, beta

! fu=user(200100, 100200, 5.876, -7.3, 0.0, 1.673, 9.658) ! 5 mph

! fu=user(200100, 100200, 5.876, -14.7, 9.5, 1.673, 9.658) ! 10 mph

! fu=user(200100, 100200, 5.876, -22.0, 6.9, 1.673, 9.658) ! 15 mph

! fu=user(200100, 100200, 5.876, -29.3, 5.2, 1.673, 9.658) ! 20 mph

! fu=user(200100, 100200, 5.876, -36.7, 5.0, 1.673, 9.658) ! 25 mph

! fu=user(200100, 100200, 5.876, -44.0, 5.0, 1.673, 9.658) ! 30 mph

! fu=user(200100, 100200, 5.876, -49.13, 5.0, 1.673, 9.658) ! 33.5 mph

! sfo/2103, i=200100, j=1002103, tra, action

, fu=user(200100, 100200,

, 12.850, 0.00, 2.00,

, 5.876, -44.0, 5.0, 1.673, 9.658) ! 30 mph

! b, v, t, lambda, beta

! sfo/2105, i=200100, j=1002102, rot, action

, fu=user(200100, 100200,

, 12.850, 0.00, 2.00,

, 5.876, -44.0, 5.0, 1.673, 9.658) ! 30 mph

! guess at the torque generated by the outboard and the hull, use

! enough to get the predicted trim angle. If the CM changes, these

! numbers will change.

! sfo/2205, i=200100, j=1002202, rot, action

, fu=1000.

! req/2001, d, i=200100, j=1002001

, c=Bullet Boat Displacement

! req/2002, v, i=200100, j=1002001

! 33.5 mph

c-Bullet Boat Velocity  
req/2003, a, i=200100, j=1002001  
c-Bullet Boat Acceleration  
req/2004, f, i=200100, j=1002001  
c-Bullet Boat Forces  
req/20881, d, i=2088, j=100  
req/2103, f, i=200100, j=1002103  
req/2105, f, i=200100, j=1002102

! hull graphics  
marker/2000, qp= 0.000, 0.000, 4.083  
marker/2001, qp= 1.000, 1.333, 3.979  
marker/2002, qp= 1.000, 0.000, 2.292  
marker/2003, qp= 1.000, 0.000, 2.292  
marker/2004, qp= 1.000, 0.000, 2.292  
marker/2005, qp= 1.000, -1.333, 3.979  
marker/2006, qp= 2.000, 2.167, 3.875  
marker/2007, qp= 2.000, 0.708, 2.042  
marker/2008, qp= 2.000, 0.000, 1.125  
marker/2009, qp= 2.000, -0.708, 2.042  
marker/2010, qp= 2.000, -2.167, 3.875  
marker/2011, qp= 3.000, 2.708, 3.813  
marker/2012, qp= 3.000, 1.625, 1.750  
marker/2013, qp= 3.000, 0.000, 0.500  
marker/2014, qp= 3.000, -1.625, 1.750  
marker/2015, qp= 3.000, -2.708, 3.813  
marker/2016, qp= 4.000, 3.021, 3.708  
marker/2017, qp= 4.000, 2.125, 1.521  
marker/2018, qp= 4.000, 0.000, 0.208  
marker/2019, qp= 4.000, -2.125, 1.521  
marker/2020, qp= 4.000, -3.021, 3.708  
marker/2021, qp= 5.000, 3.229, 3.625  
marker/2022, qp= 5.000, 2.458, 1.292  
marker/2023, qp= 5.000, 0.000, 0.063  
marker/2024, qp= 5.000, -2.458, 1.292  
marker/2025, qp= 5.000, -3.229, 3.625  
marker/2026, qp= 6.000, 3.333, 3.521  
marker/2027, qp= 6.000, 2.667, 1.063  
marker/2028, qp= 6.000, 0.000, 0.000  
marker/2029, qp= 6.000, -2.667, 1.063  
marker/2030, qp= 6.000, -3.333, 3.521  
marker/2031, qp= 7.000, 3.417, 3.458  
marker/2032, qp= 7.000, 2.833, 0.833  
marker/2033, qp= 7.000, 0.000, 0.000  
marker/2034, qp= 7.000, -2.833, 0.833  
marker/2035, qp= 7.000, -3.417, 3.458  
marker/2036, qp= 8.000, 3.458, 3.333  
marker/2037, qp= 8.000, 2.896, 0.667  
marker/2038, qp= 8.000, 0.000, 0.000  
marker/2039, qp= 8.000, -2.896, 0.667  
marker/2040, qp= 8.000, -3.458, 3.333  
marker/2041, qp= 9.000, 3.500, 3.271  
marker/2042, qp= 9.000, 2.917, 0.583  
marker/2043, qp= 9.000, 0.000, 0.000

marker/2044, qp= 9.000, -2.917, 0.583  
marker/2045, qp= 9.000, -3.500, 3.271  
marker/2046, qp=10.000, 3.500, 3.208  
marker/2047, qp=10.000, 2.938, 0.500  
marker/2048, qp=10.000, 0.000, 0.000  
marker/2049, qp=10.000, -2.938, 0.500  
marker/2050, qp=10.000, -3.500, 3.208  
marker/2051, qp=11.000, 3.500, 3.208  
marker/2052, qp=11.000, 2.938, 0.500  
marker/2053, qp=11.000, 0.000, 0.000  
marker/2054, qp=11.000, -2.938, 0.500  
marker/2055, qp=11.000, -3.500, 3.208  
marker/2056, qp=12.000, 3.500, 3.208  
marker/2057, qp=12.000, 2.938, 0.500  
marker/2058, qp=12.000, 0.000, 0.000  
marker/2059, qp=12.000, -2.938, 0.500  
marker/2060, qp=12.000, -3.500, 3.208  
marker/2061, qp=13.000, 3.500, 3.208  
marker/2062, qp=13.000, 2.938, 0.500  
marker/2063, qp=13.000, 0.000, 0.000  
marker/2064, qp=13.000, -2.938, 0.500  
marker/2065, qp=13.000, -3.500, 3.208  
marker/2066, qp=14.000, 3.500, 3.208  
marker/2067, qp=14.000, 2.938, 0.500  
marker/2068, qp=14.000, 0.000, 0.000  
marker/2069, qp=14.000, -2.938, 0.500  
marker/2070, qp=14.000, -3.500, 3.208  
marker/2071, qp=15.000, 3.500, 3.208  
marker/2072, qp=15.000, 2.938, 0.500  
marker/2073, qp=15.000, 0.000, 0.000  
marker/2074, qp=15.000, -2.938, 0.500  
marker/2075, qp=15.000, -3.500, 3.208  
marker/2076, qp=16.000, 3.500, 3.208  
marker/2077, qp=16.000, 2.938, 0.500  
marker/2078, qp=16.000, 0.000, 0.000  
marker/2079, qp=16.000, -2.938, 0.500  
marker/2080, qp=16.000, -3.500, 3.208  
marker/2081, qp=17.000, 3.500, 3.208  
marker/2082, qp=17.000, 2.938, 0.500  
marker/2083, qp=17.000, 0.000, 0.000  
marker/2084, qp=17.000, -2.938, 0.500  
marker/2085, qp=17.000, -3.500, 3.208  
marker/2086, qp=18.000, 3.500, 3.208  
marker/2087, qp=18.000, 2.938, 0.500  
marker/2088, qp=18.000, 0.000, 0.000  
marker/2089, qp=18.000, -2.938, 0.500  
marker/2090, qp=18.000, -3.500, 3.208

! Special check point

gr/200, outline-200,  
-2000, 2001, 2002  
-2000, 2004, 2005  
!  
-2001, 2006, 2007, 2002  
-2002, 2007, 2008, 2003

```

-2003, 2008, 2009, 2004
-2004, 2009, 2010, 2005
!
-2006, 2011, 2012, 2007
-2007, 2012, 2013, 2008
-2008, 2013, 2014, 2009
-2009, 2014, 2015, 2010
!
-2011, 2016, 2017, 2012
-2012, 2017, 2018, 2013
-2013, 2018, 2019, 2014
-2014, 2019, 2020, 2015
!
-2016, 2021, 2022, 2017
-2017, 2022, 2023, 2018
-2018, 2023, 2024, 2019
-2019, 2024, 2025, 2020
!
-2021, 2026, 2027, 2022
-2022, 2027, 2028, 2023
-2023, 2028, 2029, 2024
-2024, 2029, 2030, 2025
!
-2026, 2031, 2032, 2027
-2027, 2032, 2033, 2028
-2028, 2033, 2034, 2029
-2029, 2034, 2035, 2030
!
-2031, 2036, 2037, 2032
-2032, 2037, 2038, 2033
-2033, 2038, 2039, 2034
-2034, 2039, 2040, 2035
!
-2036, 2041, 2042, 2037
-2037, 2042, 2043, 2038
-2038, 2043, 2044, 2039
-2039, 2044, 2045, 2040
!
-2041, 2046, 2047, 2042
-2042, 2047, 2048, 2043
-2043, 2048, 2049, 2044
-2044, 2049, 2050, 2045
!
-2046, 2051, 2052, 2047
-2047, 2052, 2053, 2048
-2048, 2053, 2054, 2049
-2049, 2054, 2055, 2050
!
-2051, 2056, 2057, 2052
-2052, 2057, 2058, 2053
-2053, 2058, 2059, 2054
-2054, 2059, 2060, 2055
!
-2056, 2061, 2062, 2057
-2057, 2062, 2063, 2058
-2058, 2063, 2064, 2059
-2059, 2064, 2065, 2060
!
-2061, 2066, 2067, 2062
-2062, 2067, 2068, 2063
-2063, 2068, 2069, 2064
-2064, 2069, 2070, 2065
!
-2066, 2071, 2072, 2067
-2067, 2072, 2073, 2068
-2068, 2073, 2074, 2069
-2069, 2074, 2075, 2070
!
-2071, 2076, 2077, 2072
-2072, 2077, 2078, 2073
-2073, 2078, 2079, 2074
-2074, 2079, 2080, 2075
!
-2076, 2081, 2082, 2077
-2077, 2082, 2083, 2078
-2078, 2083, 2084, 2079
-2079, 2084, 2085, 2080
!
-2081, 2086, 2087, 2082
-2082, 2087, 2088, 2083
-2083, 2088, 2089, 2084
-2084, 2089, 2090, 2085
!
-2090, 2089, 2088, 2087, 2086
!
! another boat
part/300, cm=300, ma=4868, lp=50000, l56000, l56000
marker/300, qp=-20.000, 0.0, 0.75, reu=900, 0, 0
marker/301, qp=-20.000, -11.770, -1.25, reu=900, 0, 0
marker/300100, qp=-20.000, 0.0, 0.75, reu=900, 0, 0
marker/100300, qp=-20.000, 0.0, 0.75, pa=100, reu=900, 0, 0
marker/1003001, pa=100
marker/1003002, reu= 900, 900, 0, pa=100
marker/1003004, reu= 900, 900, 0, pa=100
marker/1003005, reu= 0, -900, 0, pa=100
!
! constrain boats to 3 dof
jo/200, plan, i=103, j=303
ma/103, pa=100, qp=-20.000, 0.0, 0.75
, reu=0, 900, 0
ma/303, pa=300, qp=-20.000, 0.0, 0.75
, reu=0, 900, 0
bushing/300, i=300, j=100
, c= 0, 0, 1000
! lat, fore, vert
, ct= 100000, 10000, 100000
! pitch, roll, yaw
!
! vertical
sfo/3001, i=300100, j=1003001, tra, action
, fu=user(300100, 100300, 11.770, 0.00, 2.00)
! lateral
sfo/3002, i=300100, j=1003002, tra, action
, fu= 2 * 1.2 * 19.3457 * 1.94 * vx(300100) * vx(300100) / 2.
sfo/3004, i=300100, j=1003004, rot, action
, fu= user(300100, 100300, 11.770, 0.00, 2.00)
sfo/3005, i=300100, j=1003005, rot, action
, fu= user(300100, 100300, 11.770, 0.00, 2.00)
!
req/3001, d, i=300100, j=1003001
, c=Target Boat Displacement
req/3002, v, i=300100, j=1003001
, c=Target Boat Velocity
req/3003, a, i=300100, j=1003001

```

```

, c=Target Boat Acceleration
  req/3004, f, i=300100, j=1003001
, c=Target Boat Forces

! Impact stuff starts here

! Impact points on target boat

!   port gunwale
  ma/3200, pa=300, qp=-16.50,0,1.958

  ma/303101, pa=300, qp=-16.50,0,1.958
  , reu=90,90d,0
  ma/303102, pa=300, qp=-16.50,0,1.958
  , reu=0,90d,0
  ma/303103, pa=300, qp=-16.50,0,1.958
  , reu=0,0,0

  gr/303101, cir, cm=303101, rad=.1
  gr/303102, cir, cm=303102, rad=.1
  gr/303103, cir, cm=303103, rad=.1

!   starboard gunwale
  ma/3300, pa=300, qp=-23.50,0,1.958

  ma/303104, pa=300, qp=-23.50,0,1.958
  , reu=90,90d,0
  ma/303105, pa=300, qp=-23.50,0,1.958
  , reu=0,90d,0
  ma/303106, pa=300, qp=-23.50,0,1.958
  , reu=0,0,0

  gr/303104, cir, cm=303104, rad=.1
  gr/303105, cir, cm=303105, rad=.1
  gr/303106, cir, cm=303106, rad=.1

!   port chine
  ma/3400, pa=300, qp=-17.06,0,-0.750

  ma/303107, pa=300, qp=-17.06,0,-0.750
  , reu=90,90d,0
  ma/303108, pa=300, qp=-17.06,0,-0.750
  , reu=0,90d,0
  ma/303109, pa=300, qp=-17.06,0,-0.750
  , reu=0,0,0

  gr/303107, cir, cm=303107, rad=.1
  gr/303108, cir, cm=303108, rad=.1
  gr/303109, cir, cm=303109, rad=.1

! striking boat impact circle graphics, part/200
  gr/20001, cir, cm=20001, rad=2
  gr/20002, cir, cm=20002, rad=2
  gr/20003, cir, cm=20003, rad=2
  gr/20004, cir, cm=20004, rad=2
  gr/20005, cir, cm=20005, rad=2
  gr/20006, cir, cm=20006, rad=2
  gr/20007, cir, cm=20007, rad=2
  gr/20008, cir, cm=20008, rad=2
  gr/20009, cir, cm=20009, rad=2
  gr/200010, cir, cm=200010, rad=2
  gr/200011, cir, cm=200011, rad=2
  gr/200012, cir, cm=200012, rad=2
  gr/200013, cir, cm=200013, rad=2

  gr/200014, cir, cm=200014, rad=2
  gr/200015, cir, cm=200015, rad=2
  gr/200016, cir, cm=200016, rad=2
  gr/200017, cir, cm=200017, rad=2
  gr/200018, cir, cm=200018, rad=2
  gr/200019, cir, cm=200019, rad=2

! impact centers
  ma/20001, qp= 121.746, 0, 3.808
  , reu=0,90d,0
  , pa=200
  ma/20002, qp= 122.519, 0, 2.343
  , reu=0,90d,0
  , pa=200
  ma/20003, qp= 123.060, 0, 1.571
  , reu=0,90d,0
  , pa=200
  ma/20004, qp= 123.561, 0, 1.170
  , reu=0,90d,0
  , pa=200
  ma/20005, qp= 124.287, 0, 0.937
  , reu=0,90d,0
  , pa=200
  ma/20006, qp= 125.176, 0, 0.809
  , reu=0,90d,0
  , pa=200
  ma/20007, qp= 126.000, 0, 0.750
  , reu=0,90d,0
  , pa=200
  ma/20008, qp= 127.000, 0, 0.750
  , reu=0,90d,0
  , pa=200
  ma/20009, qp= 128.000, 0, 0.750
  , reu=0,90d,0
  , pa=200
  ma/200010, qp=129.000, 0, 0.750
  , reu=0,90d,0
  , pa=200
  ma/200011, qp=130.000, 0, 0.750
  , reu=0,90d,0
  , pa=200
  ma/200012, qp=131.000, 0, 0.750
  , reu=0,90d,0
  , pa=200
  ma/200013, qp=132.000, 0, 0.750
  , reu=0,90d,0
  , pa=200
  ma/200015, qp=134.000, 0, 0.750
  , reu=0,90d,0
  , pa=200
  ma/200016, qp=135.000, 0, 0.750
  , reu=0,90d,0
  , pa=200
  ma/200017, qp=136.000, 0, 0.750
  , reu=0,90d,0
  , pa=200
  ma/200018, qp=137.000, 0, 0.750
  , reu=0,90d,0
  , pa=200
  ma/200019, qp=138.000, 0, 0.750
  , reu=0,90d,0

```

```
, pa=200

! impact forces *****

! ***** port gunwale
! falls at 5,000 lbs

sf/3201, tr, i=20001, j=3200
, fu=user( 20001, 3200, 2, 8500, 1, 10, 0.1, 5000 )
! fu=user( i, j, xl, k, e, Cmax, d, Fbreak )
re/32011, d, i=20001, j=3200
, c=port gunwale
re/32014, f, i=20001, j=3200

sf/3202, tr, i=20002, j=3200
, fu=user( 20002, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32021, d, i=20002, j=3200
re/32024, f, i=20002, j=3200

sf/3203, tr, i=20003, j=3200
, fu=user( 20003, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32031, d, i=20003, j=3200
re/32034, f, i=20003, j=3200

sf/3204, tr, i=20004, j=3200
, fu=user( 20004, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32041, d, i=20004, j=3200
re/32044, f, i=20004, j=3200

sf/3205, tr, i=20005, j=3200
, fu=user( 20005, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32051, d, i=20005, j=3200
re/32054, f, i=20005, j=3200

sf/3206, tr, i=20006, j=3200
, fu=user( 20006, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32061, d, i=20006, j=3200
re/32064, f, i=20006, j=3200

sf/3207, tr, i=20007, j=3200
, fu=user( 20007, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32074, f, i=20007, j=3200

sf/3208, tr, i=20008, j=3200
, fu=user( 20008, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32084, f, i=20008, j=3200

sf/3209, tr, i=20009, j=3200
, fu=user( 20009, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32094, f, i=20009, j=3200

sf/3210, tr, i=20010, j=3200
, fu=user( 20010, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32104, f, i=20010, j=3200

sf/3211, tr, i=20011, j=3200
, fu=user( 20011, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32114, f, i=20011, j=3200

sf/3212, tr, i=20012, j=3200
, fu=user( 20012, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32124, f, i=20012, j=3200

sf/3213, tr, i=20013, j=3200
, fu=user( 20013, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32134, f, i=20013, j=3200

sf/3214, tr, i=20014, j=3200
, fu=user( 20014, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32144, f, i=20014, j=3200

sf/3215, tr, i=20015, j=3200
, fu=user( 20015, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32154, f, i=20015, j=3200

sf/3216, tr, i=20016, j=3200
, fu=user( 20016, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32164, f, i=20016, j=3200

sf/3217, tr, i=20017, j=3200
, fu=user( 20017, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32174, f, i=20017, j=3200

sf/3218, tr, i=20018, j=3200
, fu=user( 20018, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32184, f, i=20018, j=3200

sf/3219, tr, i=20019, j=3200
, fu=user( 20019, 3200, 2, 8500, 1, 10, 0.1, 5000 )
re/32194, f, i=20019, j=3200

! ***** starboard gunwale
! does not fail

sf/3301, tr, i=20001, j=3300
, fu=user( 20001, 3300, 2, 8500, 1, 10, 0.1, 5000 )
! fu=user( i, j, xl, k, e, Cmax, d )
re/33014, f, i=20001, j=3300

sf/3302, tr, i=20002, j=3300
, fu=user( 20002, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33024, f, i=20002, j=3300

sf/3303, tr, i=20003, j=3300
, fu=user( 20003, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33034, f, i=20003, j=3300

sf/3304, tr, i=20004, j=3300
, fu=user( 20004, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33044, f, i=20004, j=3300

sf/3305, tr, i=20005, j=3300
, fu=user( 20005, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33054, f, i=20005, j=3300

sf/3306, tr, i=20006, j=3300
, fu=user( 20006, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33064, f, i=20006, j=3300

sf/3307, tr, i=20007, j=3300
, fu=user( 20007, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33074, f, i=20007, j=3300

sf/3308, tr, i=20008, j=3300
, fu=user( 20008, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33084, f, i=20008, j=3300
```



```
sf/3309, tr, i=20009, j=3300
, fu=user( 20009, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33094, f, i=20009, j=3300

sf/3310, tr, i=20010, j=3300
, fu=user( 20010, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33104, f, i=20010, j=3300

sf/3311, tr, i=20011, j=3300
, fu=user( 20011, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33114, f, i=20011, j=3300

sf/3312, tr, i=20012, j=3300
, fu=user( 20012, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33124, f, i=20012, j=3300

sf/3313, tr, i=20013, j=3300
, fu=user( 20013, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33134, f, i=20013, j=3300

sf/3314, tr, i=20014, j=3300
, fu=user( 20014, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33144, f, i=20014, j=3300

sf/3315, tr, i=20015, j=3300
, fu=user( 20015, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33154, f, i=20015, j=3300

sf/3316, tr, i=20016, j=3300
, fu=user( 20016, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33164, f, i=20016, j=3300

sf/3317, tr, i=20017, j=3300
, fu=user( 20017, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33174, f, i=20017, j=3300

sf/3318, tr, i=20018, j=3300
, fu=user( 20018, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33184, f, i=20018, j=3300

sf/3319, tr, i=20019, j=3300
, fu=user( 20019, 3300, 2, 8500, 1, 10, 0.1, 5000 )
re/33194, f, i=20019, j=3300

! ***** port chine
! does not fall

sf/3401, tr, i=20001, j=3400
, fu=user( 20001, 3400, 2, 8500, 1, 10, 0.1, 5000 )
! fu=user( i, j, xl, k, e, cmax, d )
re/34014, f, i=20001, j=3400

sf/3402, tr, i=20002, j=3400
, fu=user( 20002, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34024, f, i=20002, j=3400

sf/3403, tr, i=20003, j=3400
, fu=user( 20003, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34034, f, i=20003, j=3400

sf/3404, tr, i=20004, j=3400
, fu=user( 20004, 3400, 2, 8500, 1, 10, 0.1, 5000 )

re/34044, f, i=20004, j=3400

sf/3405, tr, i=20005, j=3400
, fu=user( 20005, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34054, f, i=20005, j=3400

sf/3406, tr, i=20006, j=3400
, fu=user( 20006, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34064, f, i=20006, j=3400

sf/3407, tr, i=20007, j=3400
, fu=user( 20007, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34074, f, i=20007, j=3400

sf/3408, tr, i=20008, j=3400
, fu=user( 20008, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34084, f, i=20008, j=3400

sf/3409, tr, i=20009, j=3400
, fu=user( 20009, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34094, f, i=20009, j=3400

sf/3410, tr, i=20010, j=3400
, fu=user( 20010, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34104, f, i=20010, j=3400

sf/3411, tr, i=20011, j=3400
, fu=user( 20011, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34114, f, i=20011, j=3400

sf/3412, tr, i=20012, j=3400
, fu=user( 20012, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34124, f, i=20012, j=3400

sf/3413, tr, i=20013, j=3400
, fu=user( 20013, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34134, f, i=20013, j=3400

sf/3414, tr, i=20014, j=3400
, fu=user( 20014, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34144, f, i=20014, j=3400

sf/3415, tr, i=20015, j=3400
, fu=user( 20015, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34154, f, i=20015, j=3400

sf/3416, tr, i=20016, j=3400
, fu=user( 20016, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34164, f, i=20016, j=3400

sf/3417, tr, i=20017, j=3400
, fu=user( 20017, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34174, f, i=20017, j=3400

sf/3418, tr, i=20018, j=3400
, fu=user( 20018, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34184, f, i=20018, j=3400

sf/3419, tr, i=20019, j=3400
, fu=user( 20019, 3400, 2, 8500, 1, 10, 0.1, 5000 )
re/34194, f, i=20019, j=3400

!
! impact request
```

```

re/3200, t=Null:PortGunl:StarGunl:PortChin:Null:Total
, c=Impact Forces
, fu=user(1)

! friction
!
! The models are set up to collide at about 3 sec. Use about .1*static
! boat weight or 486.8 opposing the motion of the boat.

sfo/2501, i=200100, j=1002504, tra, actiononly
, fu= 486.8 * (
,   havsin(time, 3.1, 0.0, 3.2, 1.0)
,   -havsin(time, 3.8, 0.0, 3.9, 1.0) )

sfo/3501, i=300100, j=1003504, tra, actiononly
, fu= -486.8 * (
,   havsin(time, 3.1, 0.0, 3.2, 1.0)
,   -havsin(time, 3.8, 0.0, 3.9, 1.0) )

marker/1002504, reu= 90D, 0, pa=100
marker/1003504, reu= 90D, 90D, 0, pa=100
! friction
! friction

```

end



## **APPENDIX D**

### **Output from the 30 MPH Simulation - Graphs**



## LIST OF GRAPHS PROVIDED FOR THE 30 MPH COLLISION

ReqNo.	Col.	Axis	Parameter
2001	1	Y	BB Displacement
2002	1	Y	BB Velocity
2003	1	Y	BB Acceleration
2001	3	Z	BB Displacement
2002	3	Z	BB Velocity
2003	3	Z	BB Acceleration
2004	3	Z	BB Forces (Buoyant)
2001	5	Pitch	BB Displacement
2002	5	Pitch	BB Velocity
2003	5	Pitch	BB Acceleration
2001	1,3	X,Z	BB CG Disp (Z) vs BB CG Disp (X) (CG Trajectory)
3001	1	X	TB Displacement
3002	1	X	TB Velocity
3003	1	X	TB Acceleration
3001	3	Z	TB Displacement
3002	3	Z	TB Velocity
3003	3	Z	TB Acceleration
3004	3	Z	TB Forces (Buoyant Forces)
3001	5	Pitch	TB Displacement
3002	5	Pitch	TB Velocity
3003	5	Pitch	TB Acceleration

### Force Diagrams

Port Gunwale Impact Forces  
(First two of 19 impact fields)

Starboard Gunwale Impact Forces  
(Five impact fields)

Port Chine Impact Forces  
(Three impact fields)

Total Port Gunwale Impact Force  
Total Starboard Gunwale Impact Force  
Total Port Chine Impact Force  
Total Impact Force

#### Key:

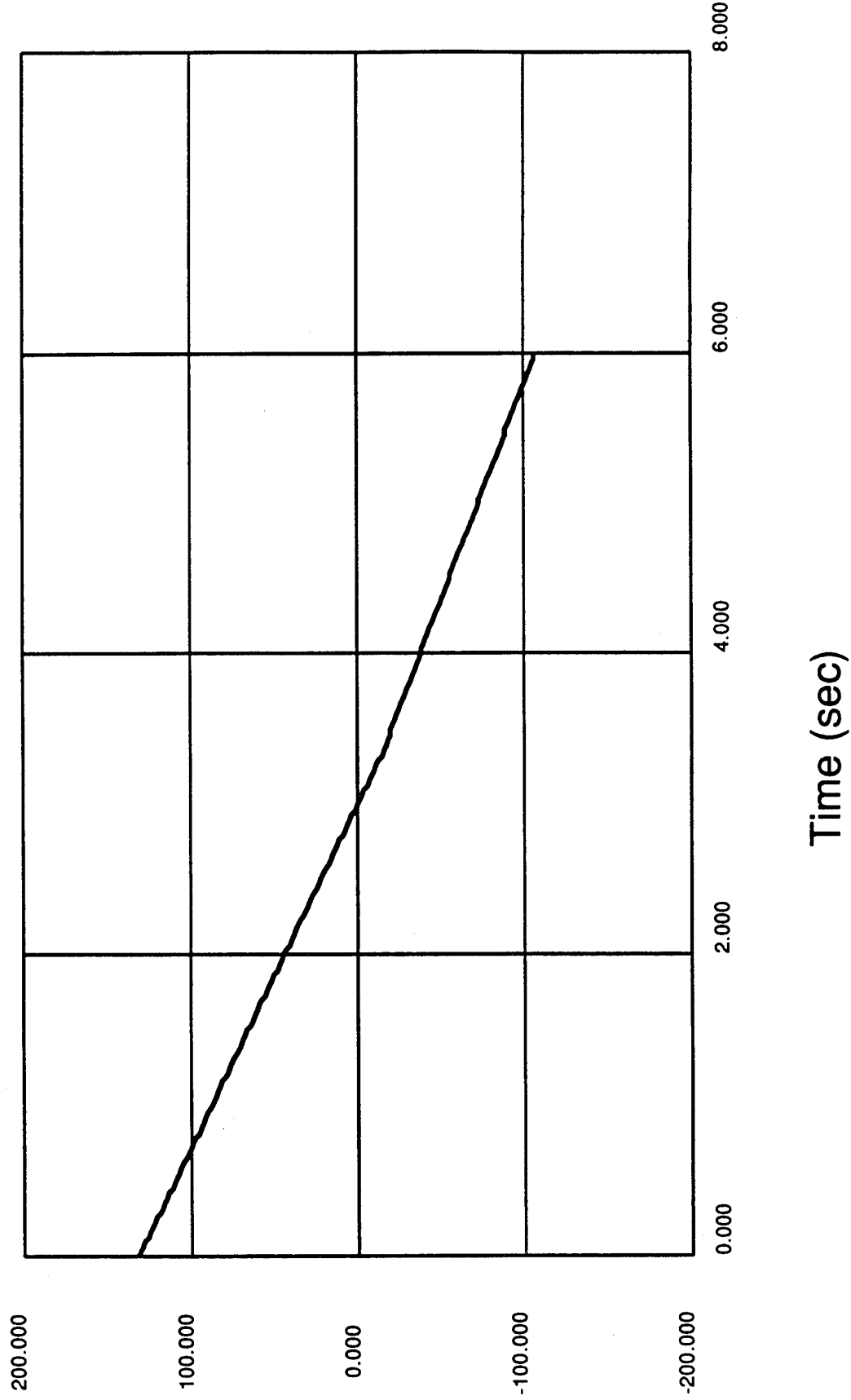
Col 1 = x axis  
Col 2 = y axis  
Col 3 = z axis

Col 4 = Yaw  
Col 5 = Pitch  
Col 6 = Roll

BB = Bullet Boat  
TB = Target Boat

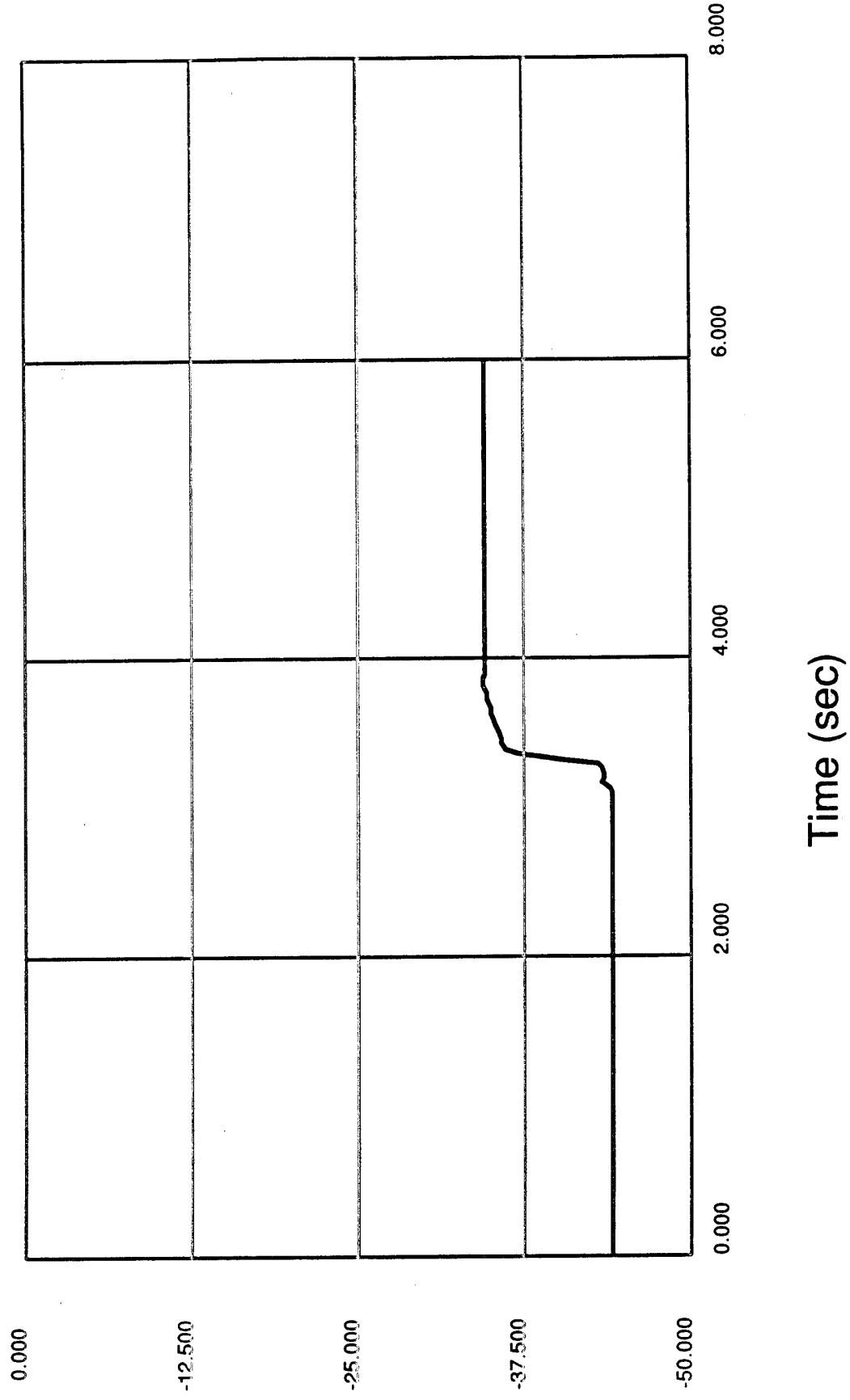


# Req 2001, Col 1, Bullet Boat Displacement

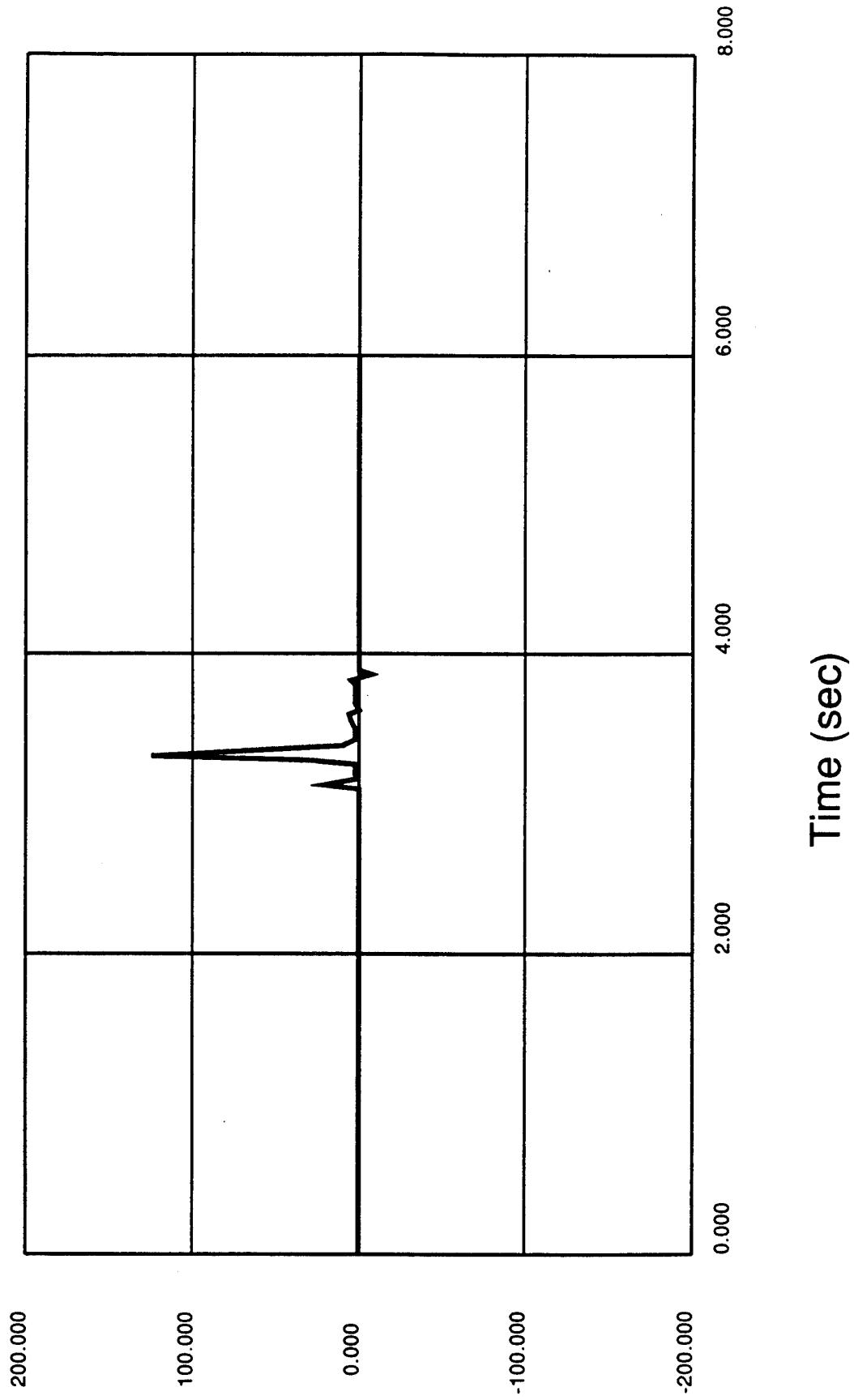




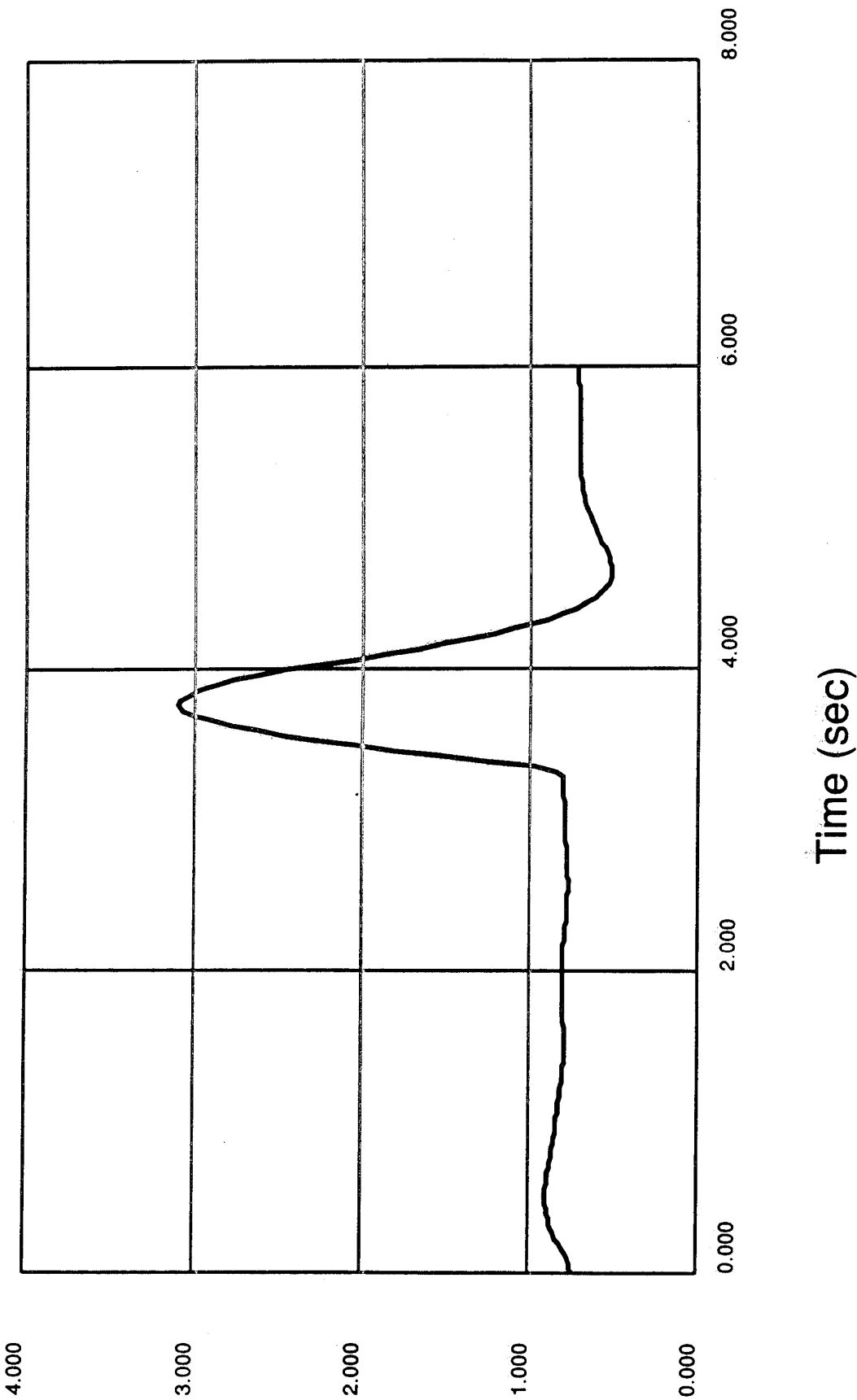
# Req 2002, Col 1, Bullet Boat Velocity



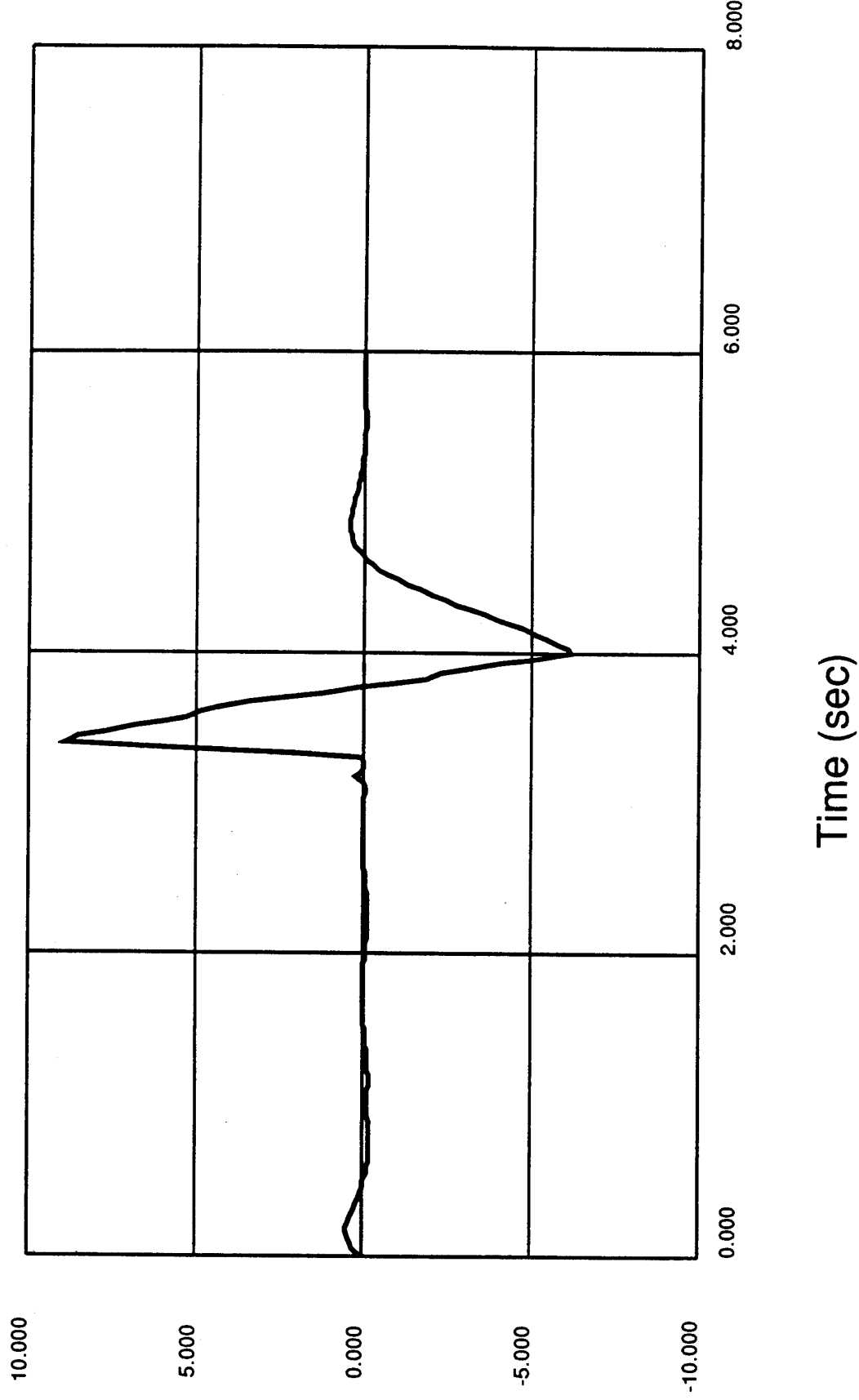
# Req 2003, Col 1, Bullet Boat Acceleration



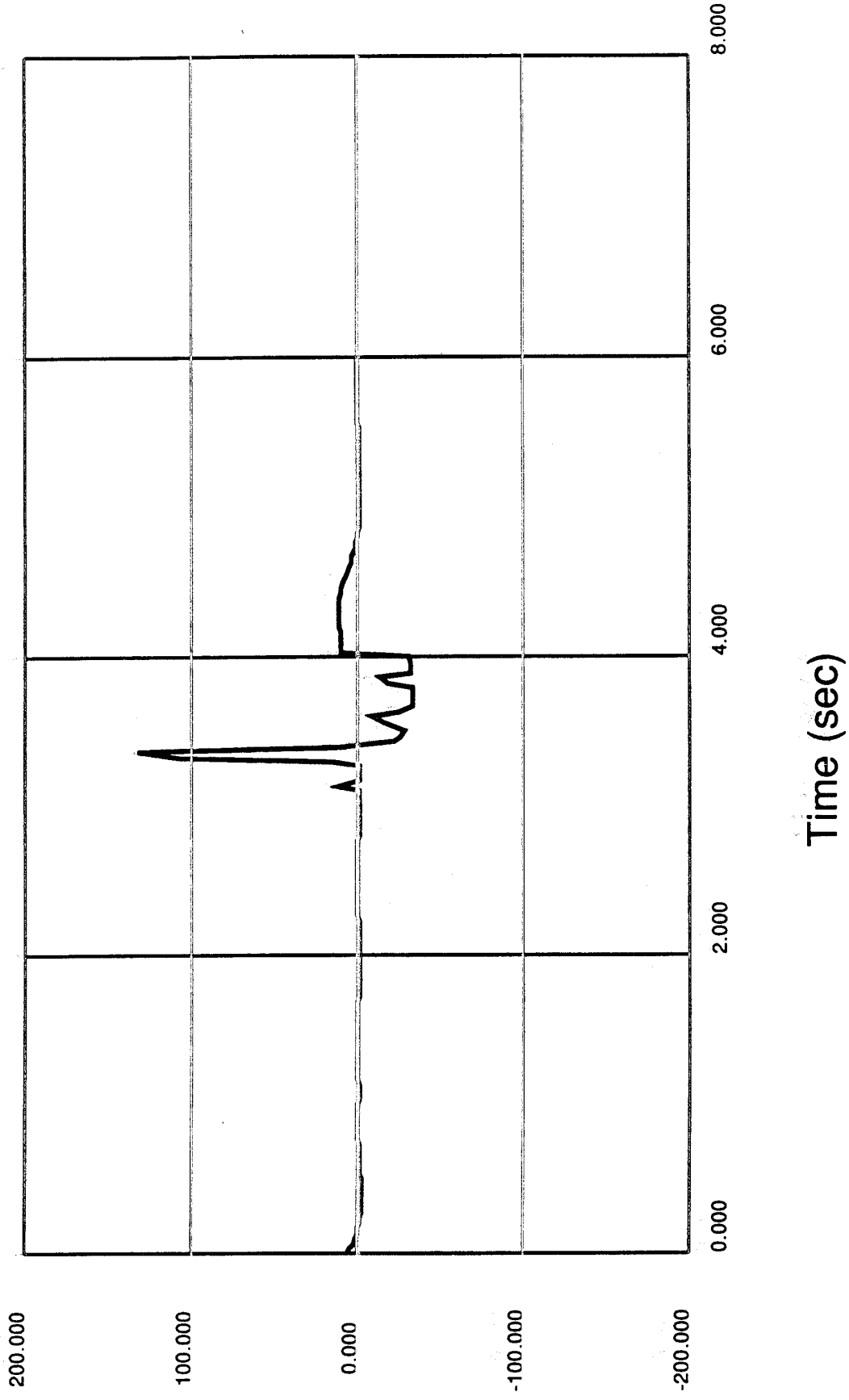
Req 2001, Col 3, Bullet Boat Displacement



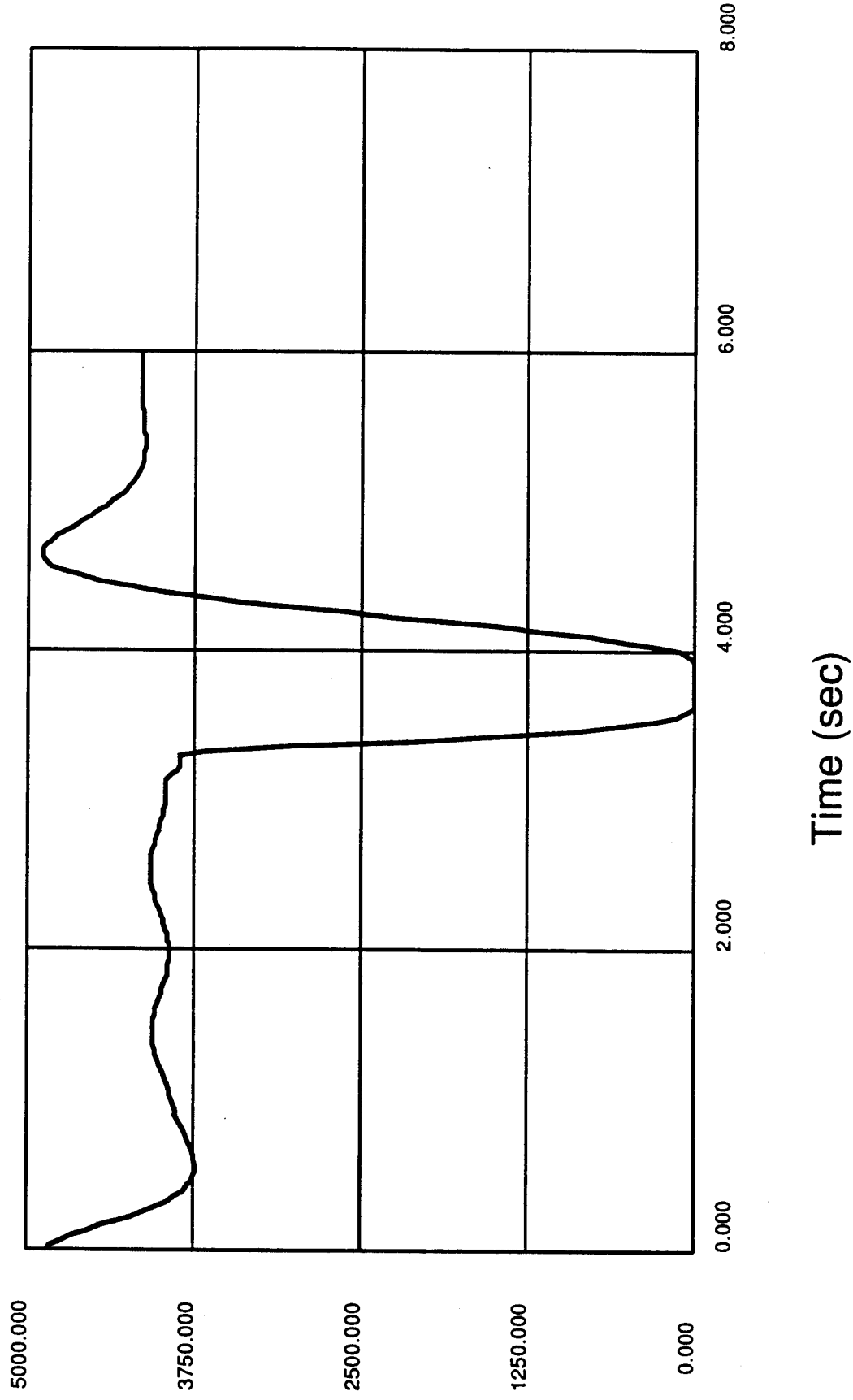
# Req 2002, Col 3, Bullet Boat Velocity



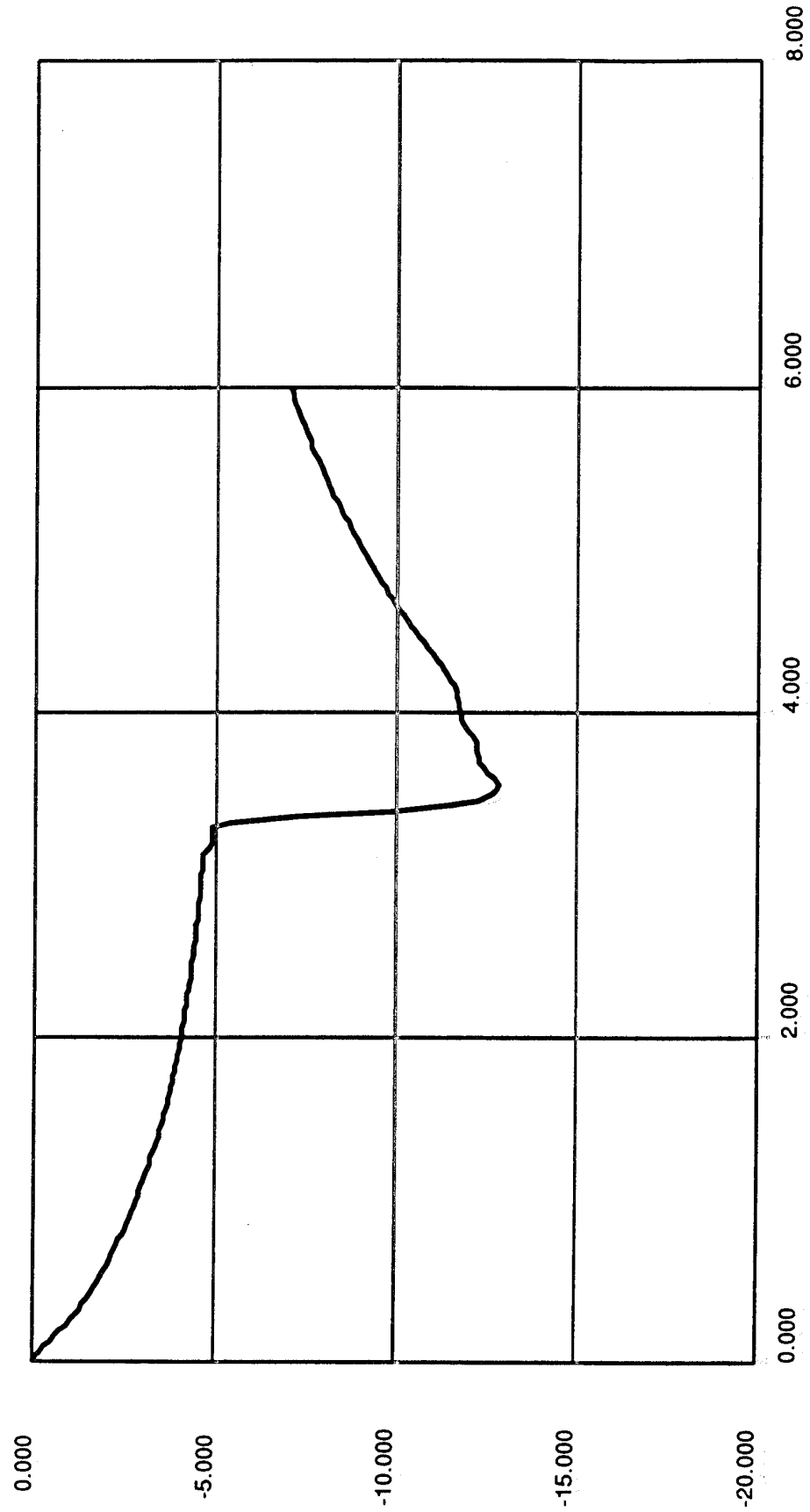
# Req 2003, Col 3, Bullet Boat Acceleration



# Req 2004, Col 3, Bullet Boat Forces

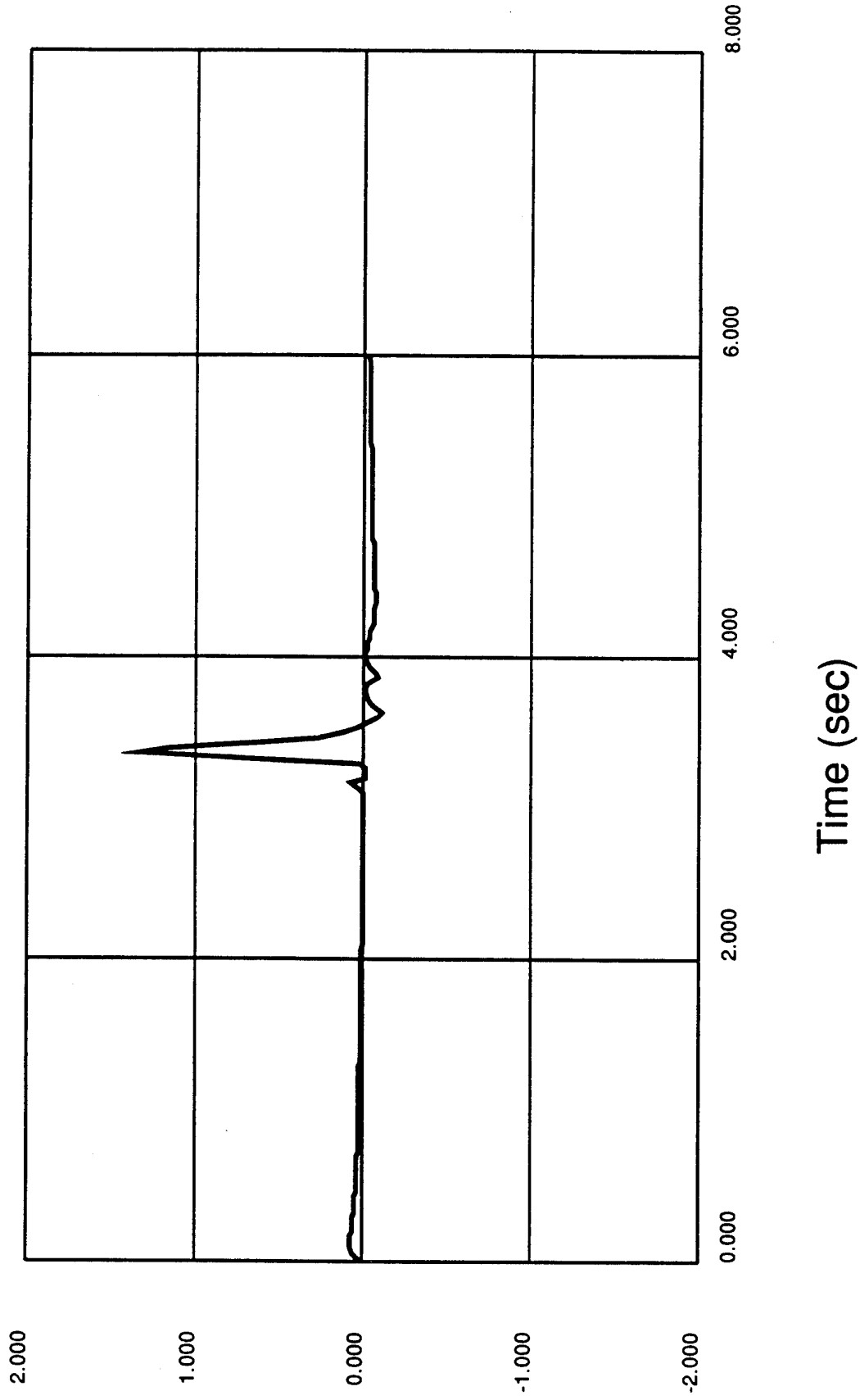


Req 2001, Col 5, Bullet Boat Displacement



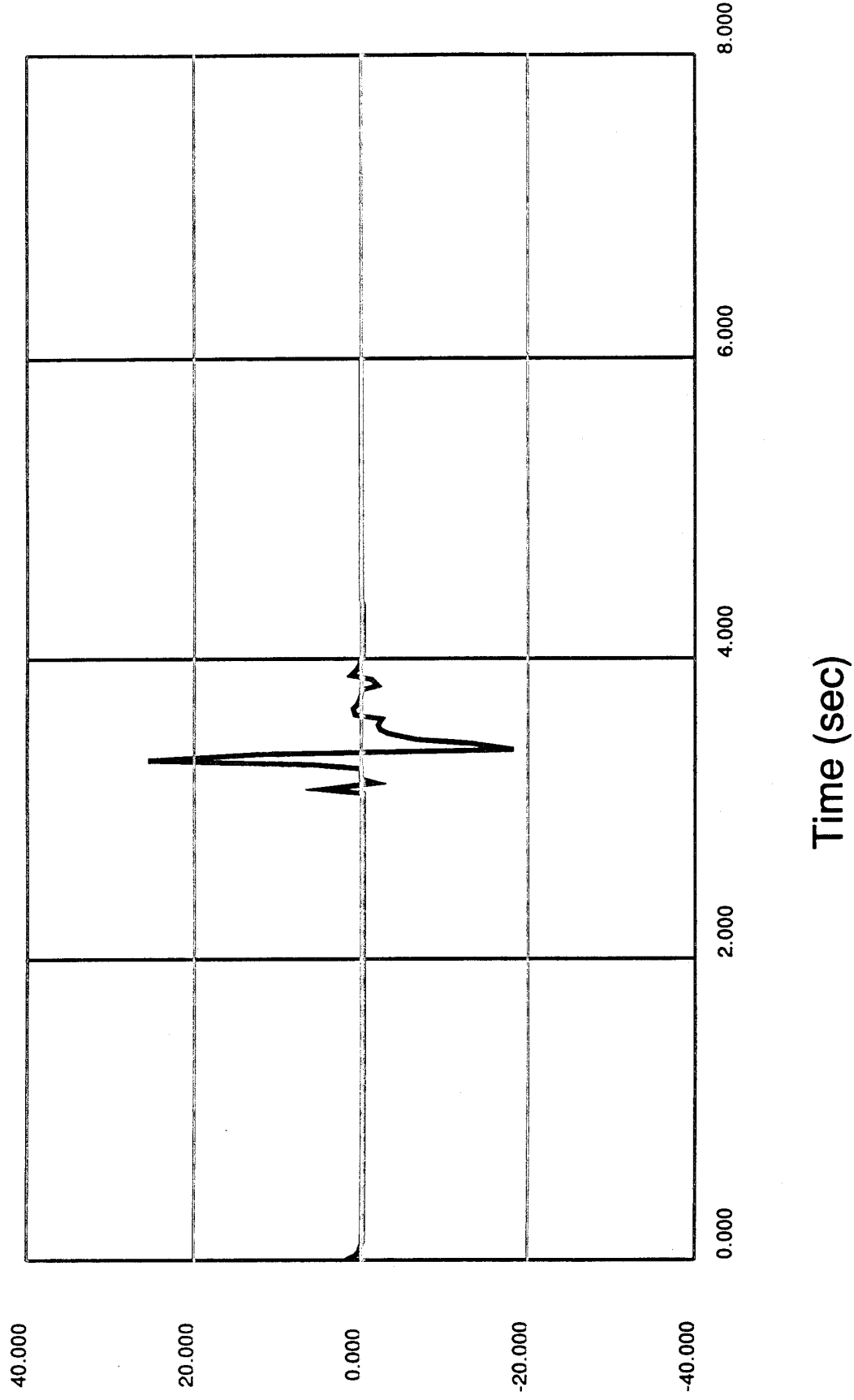
Time (sec)

# Req 2002, Col 5, Bullet Boat Velocity

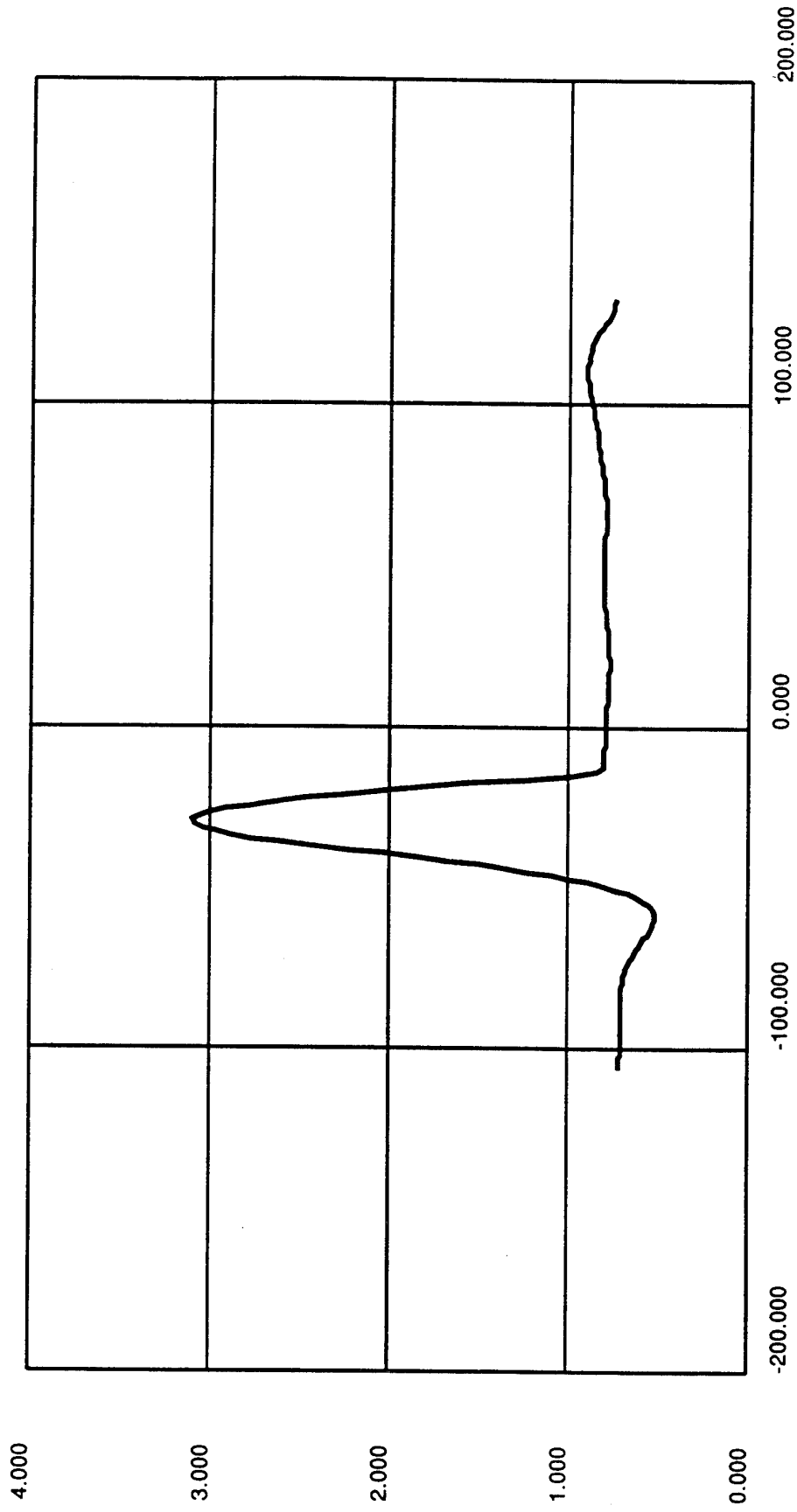




# Req 2003, Col 5, Bullet Boat Acceleration

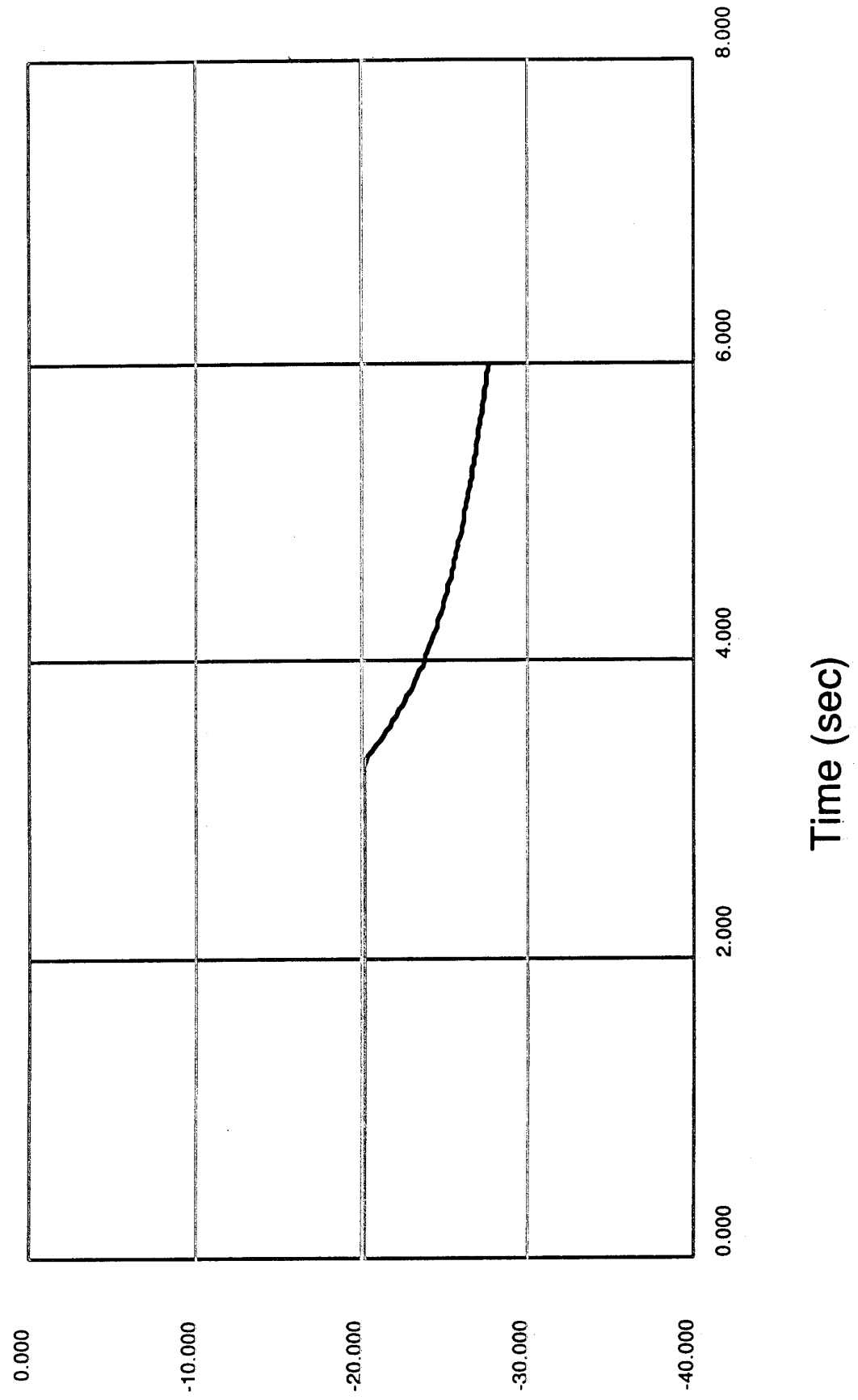


Req 2001, Col 1, Bullet Boat Displacement  
Req 2001, Col 3, Bullet Boat Displacement

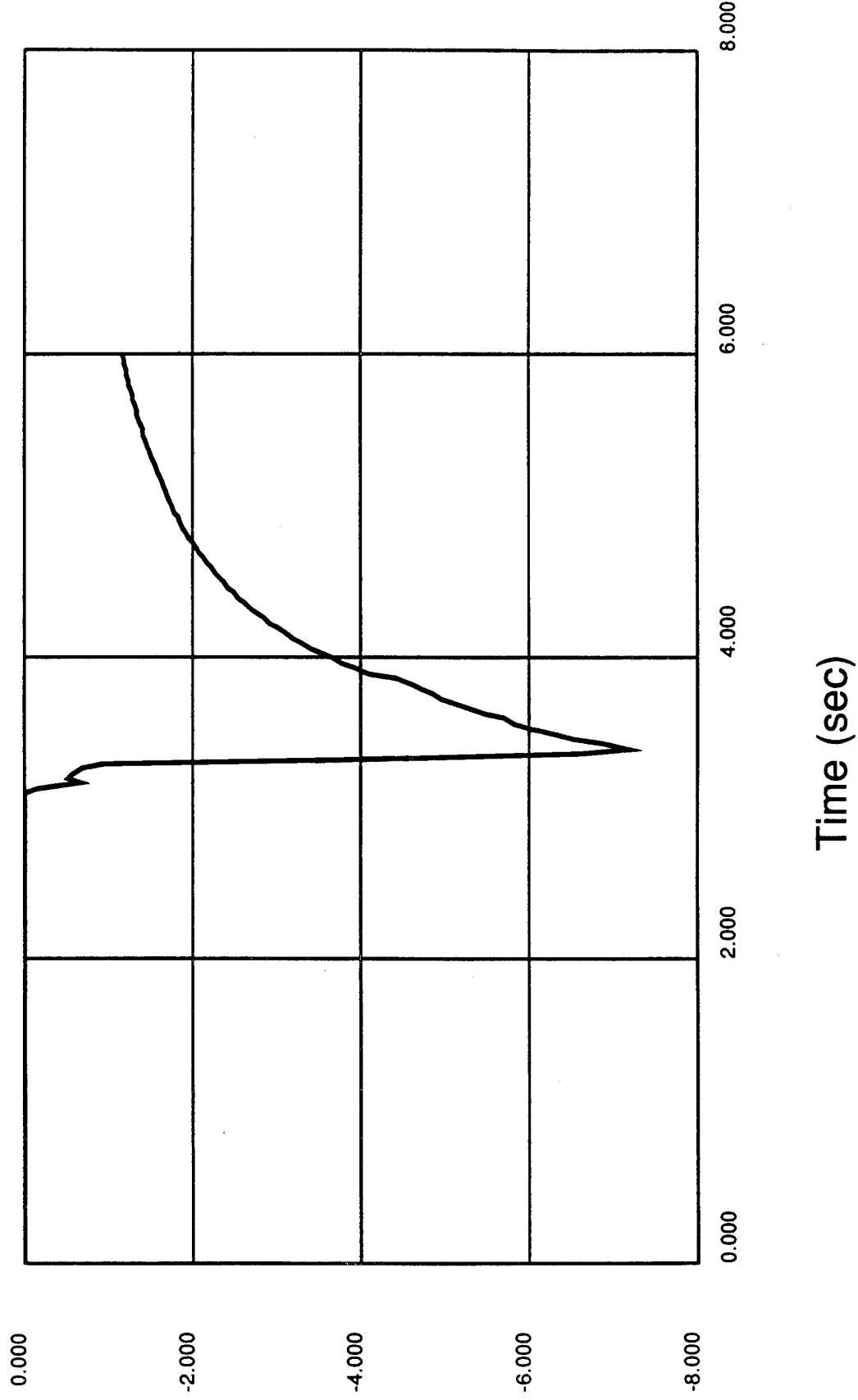


Bullet Boat CG Trajectory

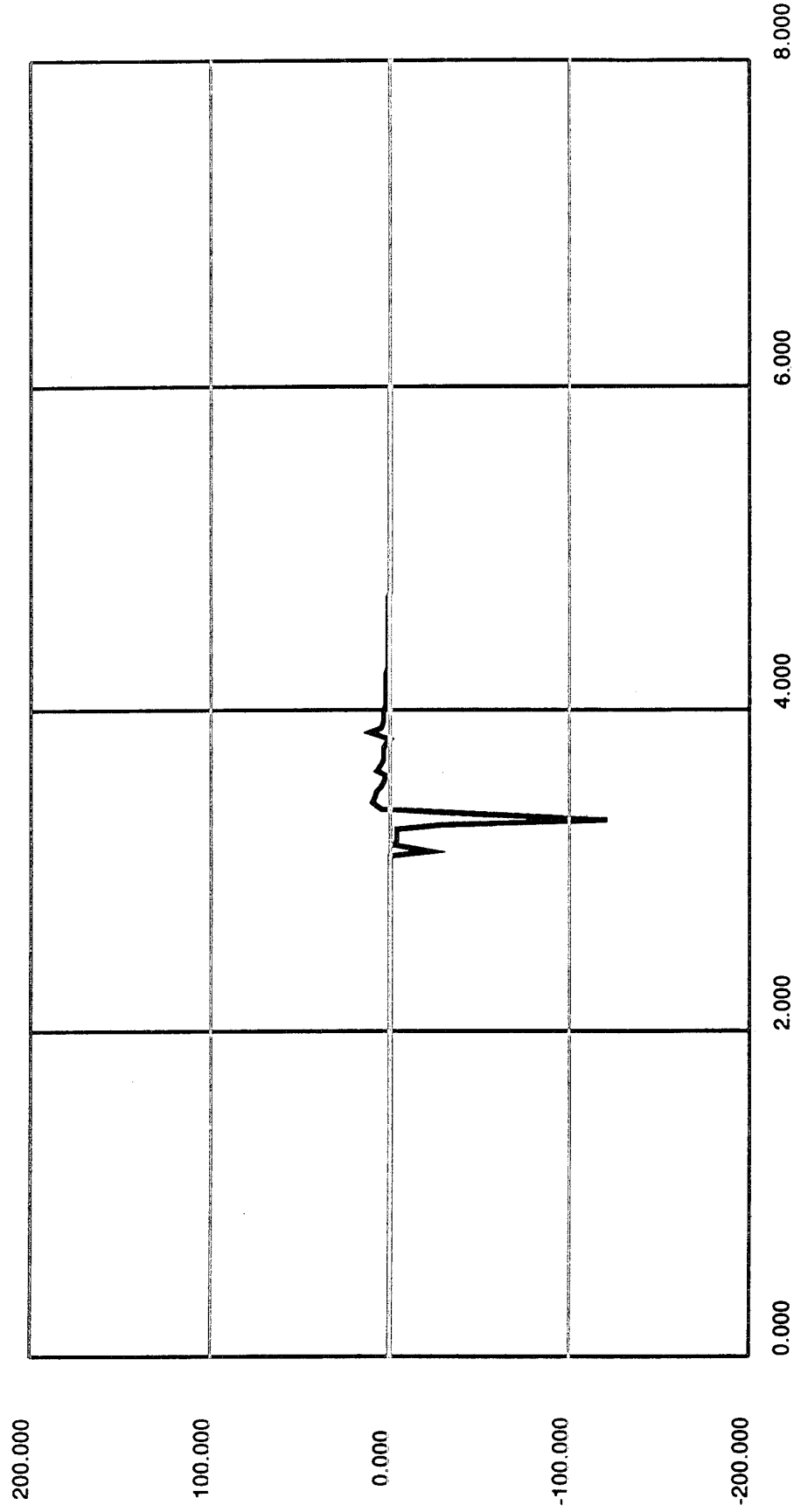
# Req 3001, Col 1, Target Boat Displacement



# Req 3002, Col 1, Target Boat Velocity

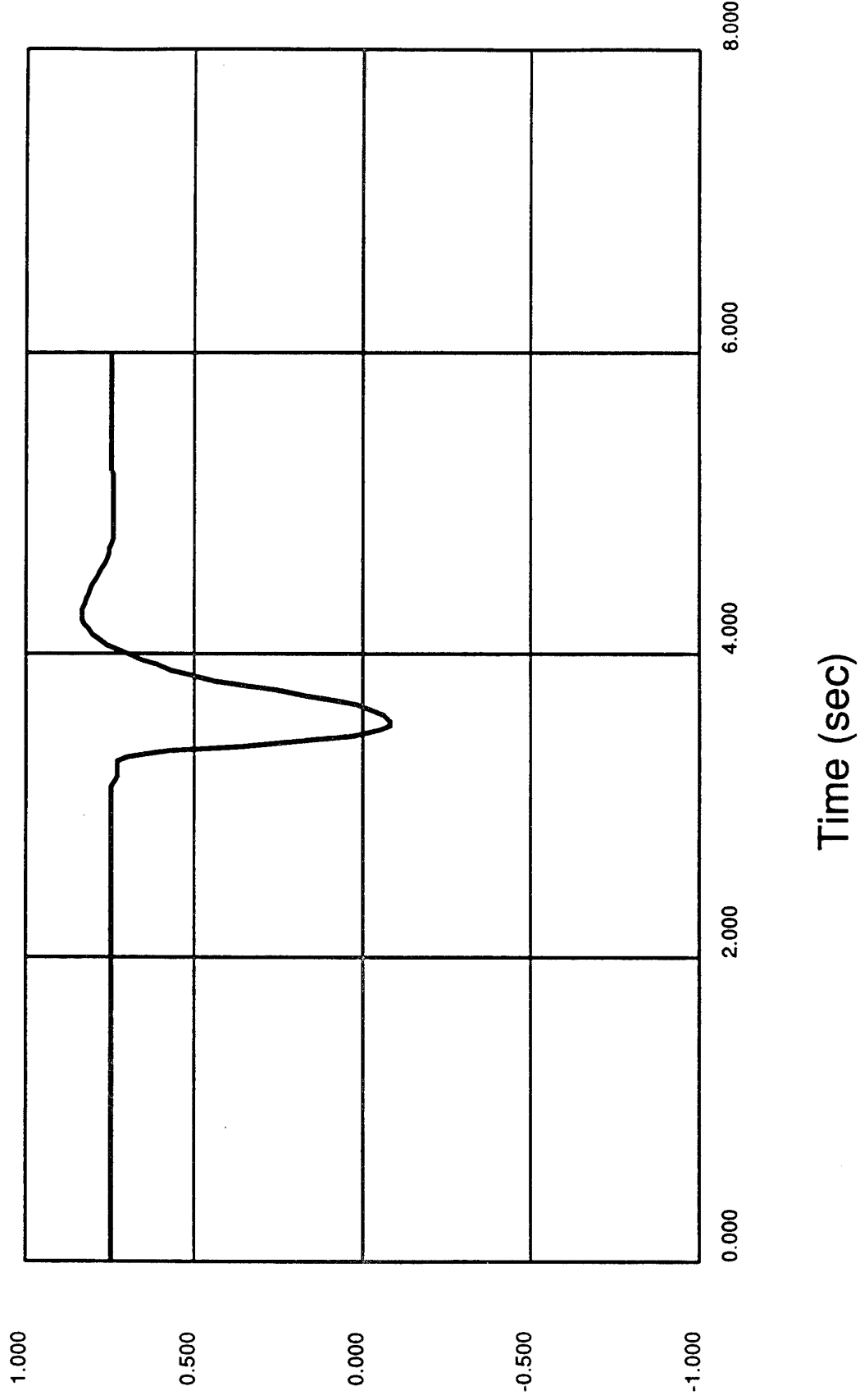


# Req 3003, Col 1, Target Boat Acceleration

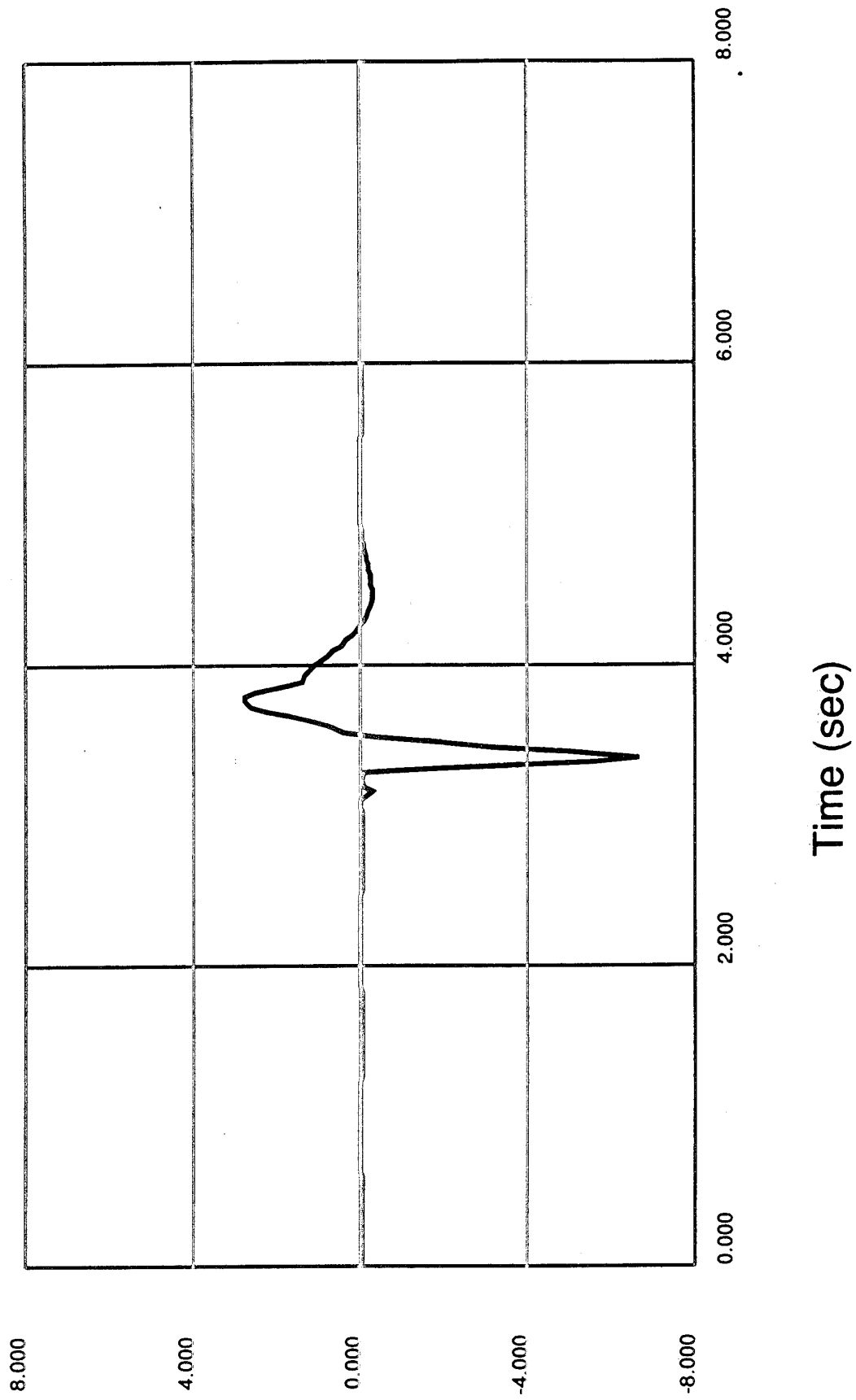


Time (sec)

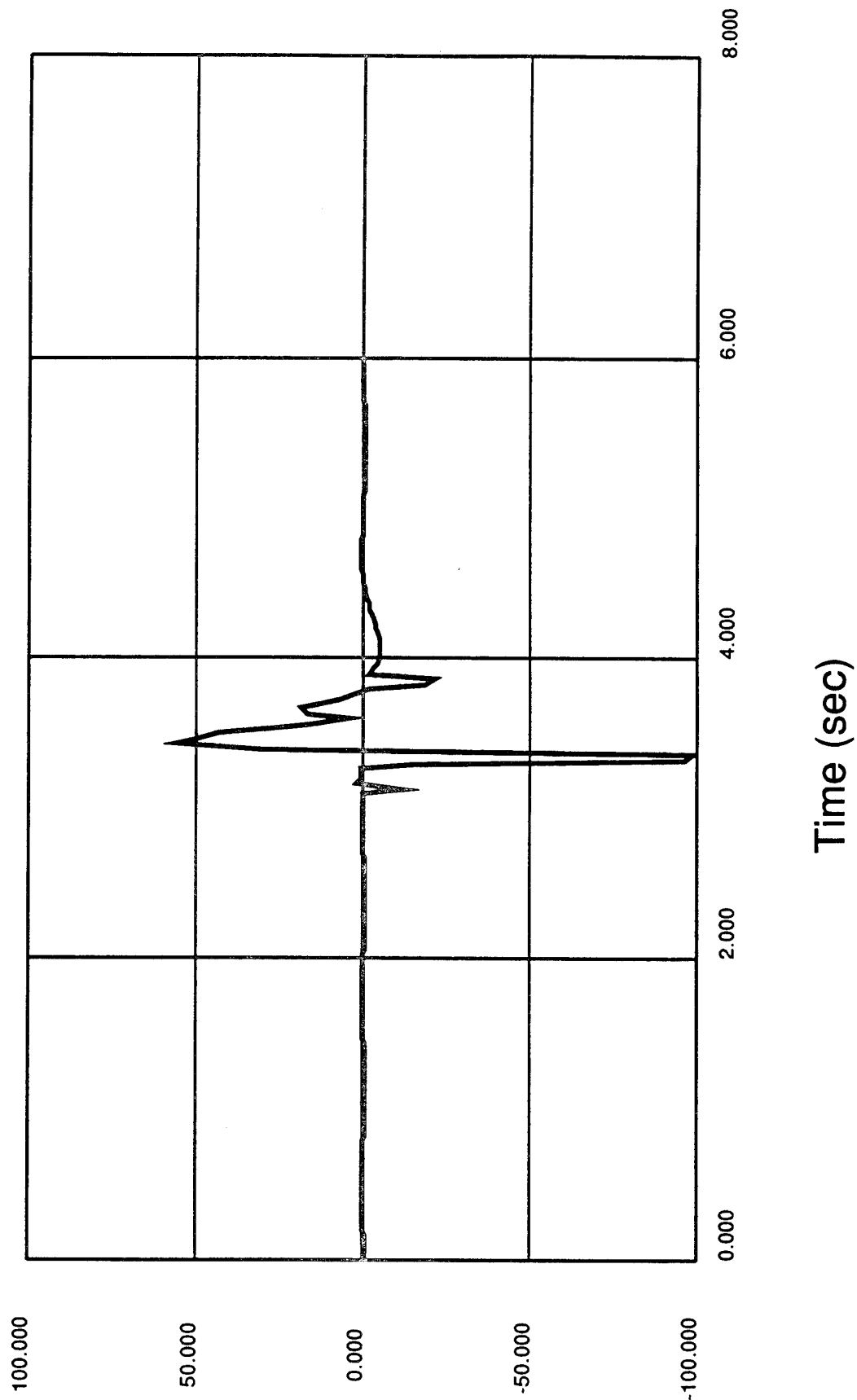
# Req 3001, Col 3, Target Boat Displacement



# Req 3002, Col 3, Target Boat Velocity

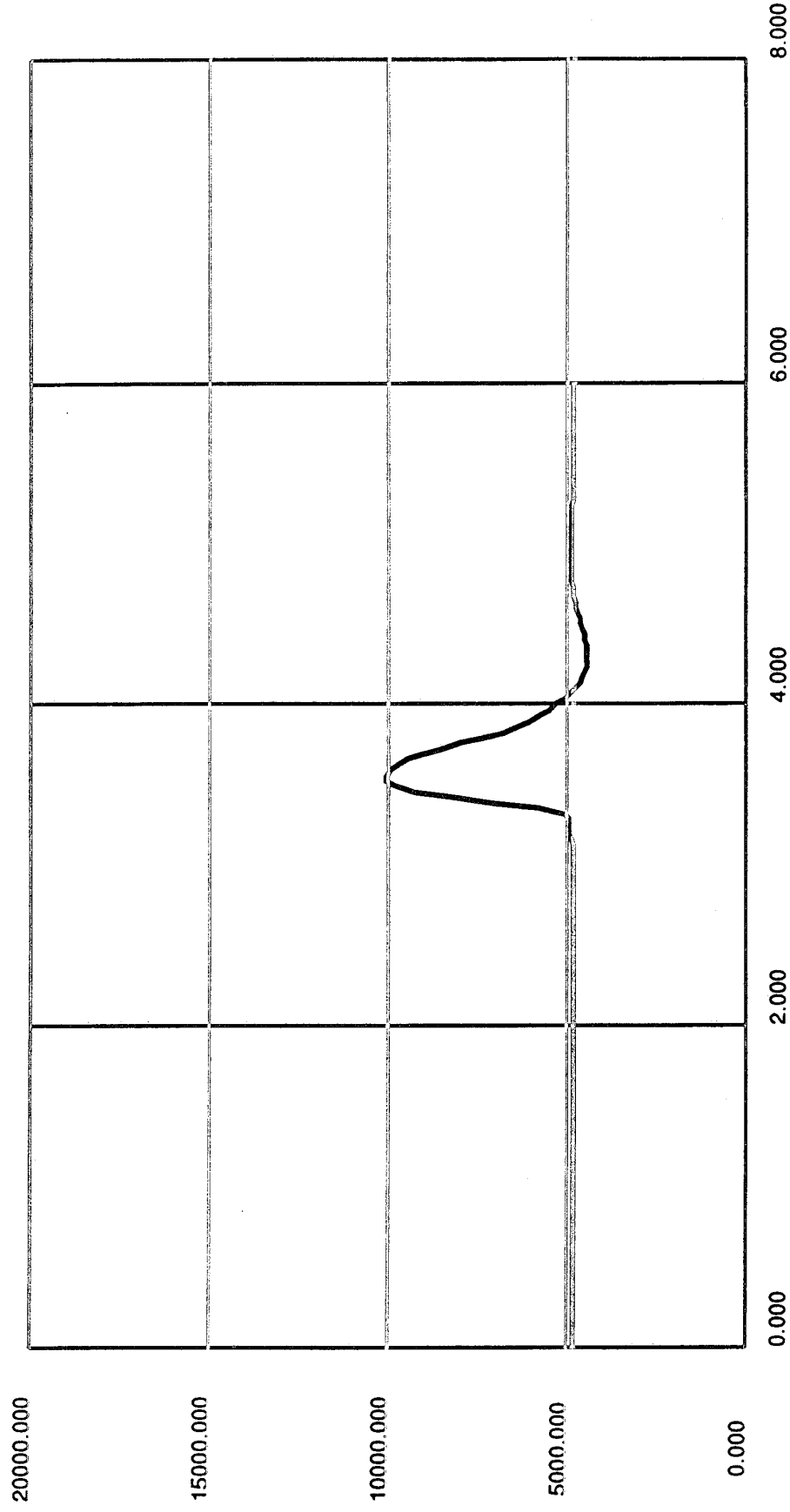


# Req 3003, Col 3, Target Boat Acceleration



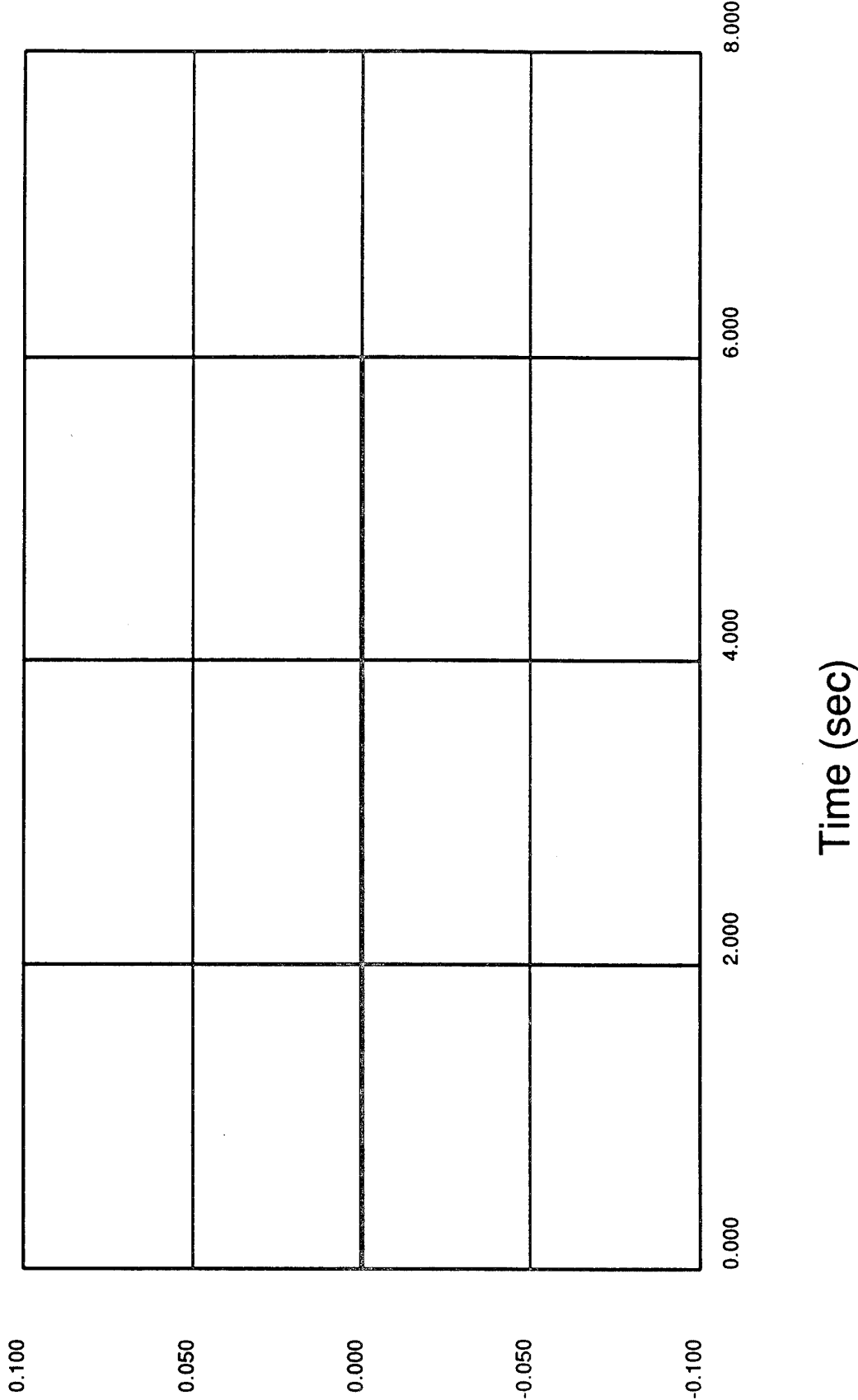


# Req 3004, Col 3, Target Boat Forces

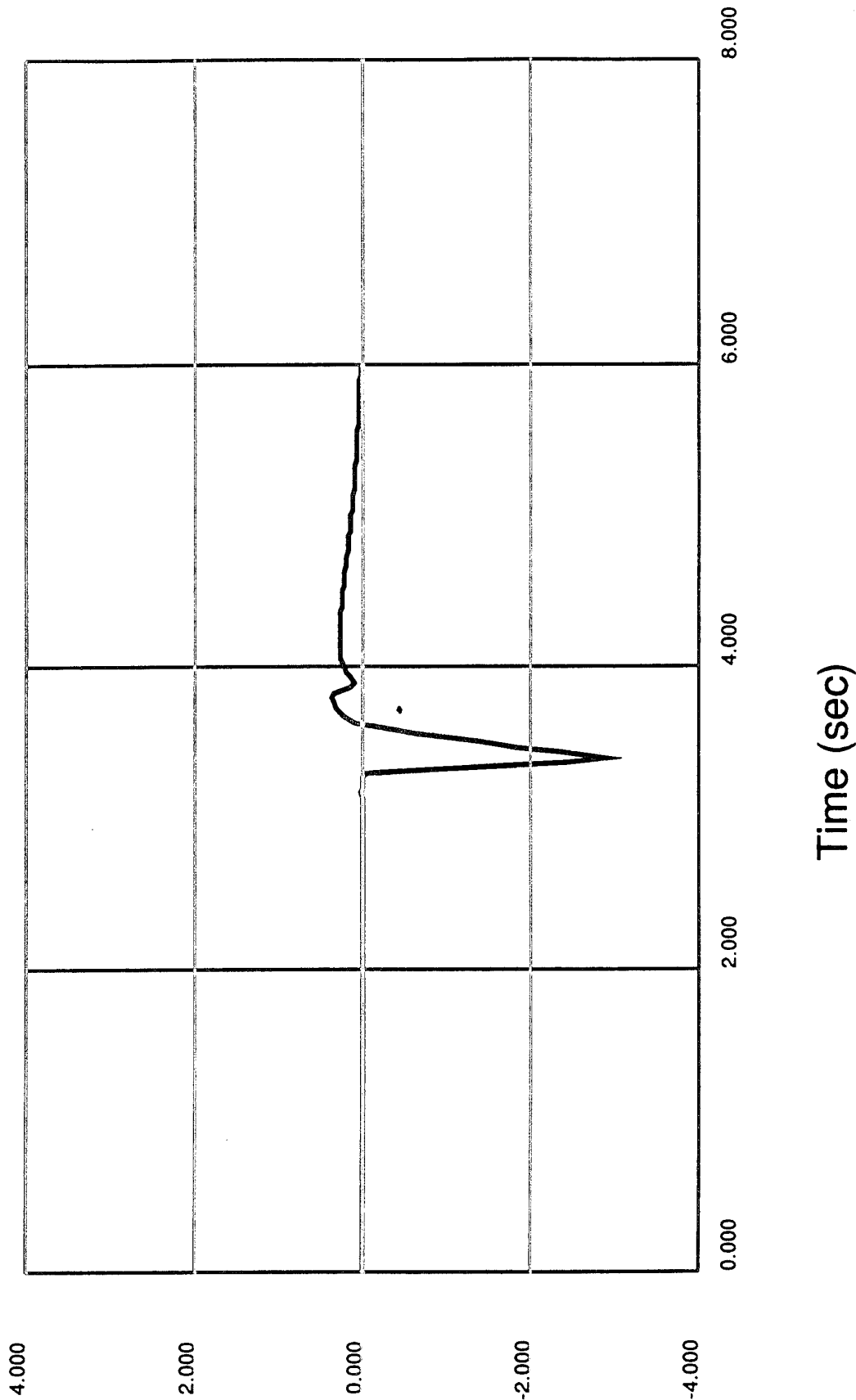


Time (sec)

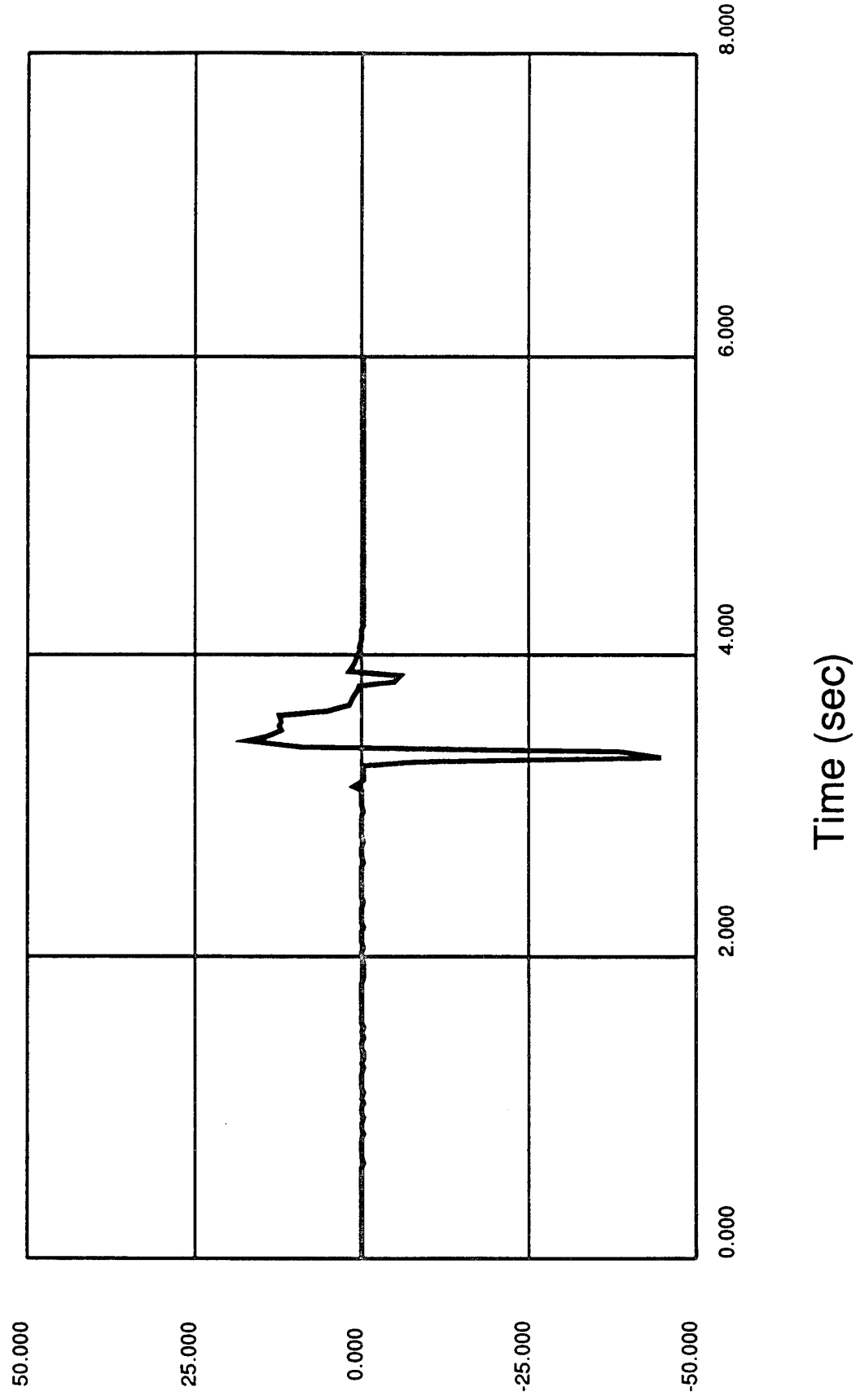
Req 3001, Col 5, Target Boat Displacement



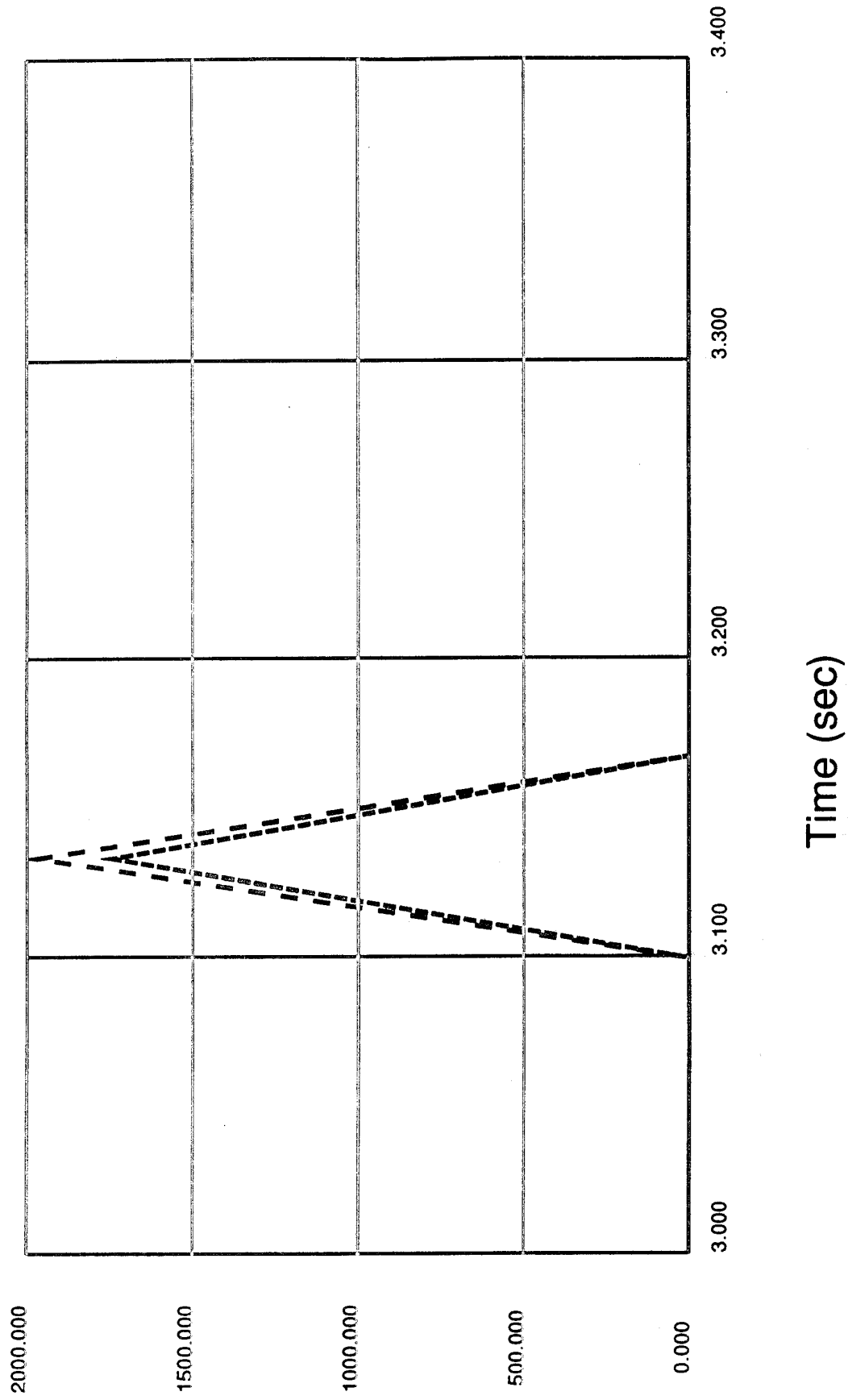
# Req 3002, Col 5, Target Boat Velocity



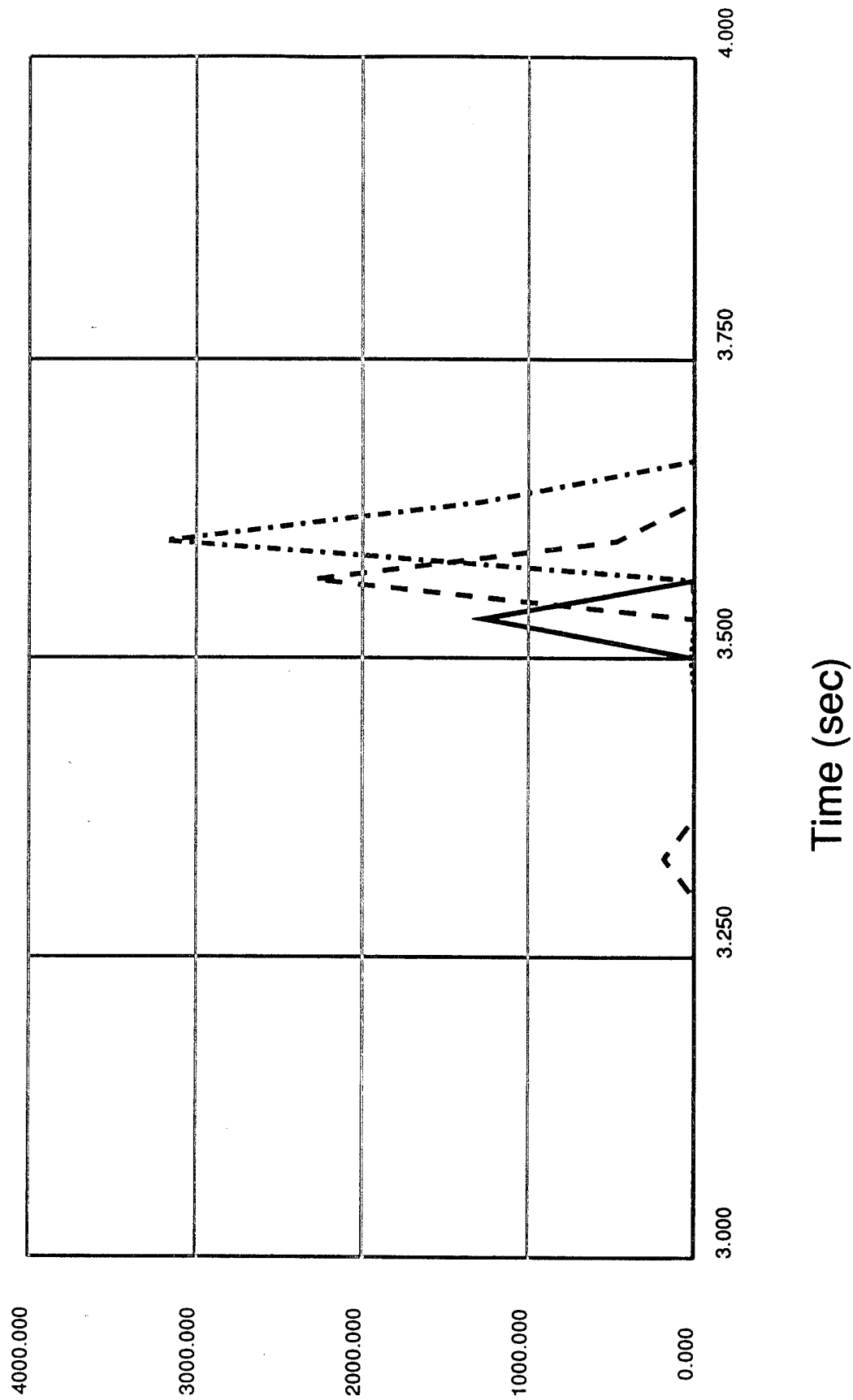
# Req 3003, Col 5, Target Boat Acceleration



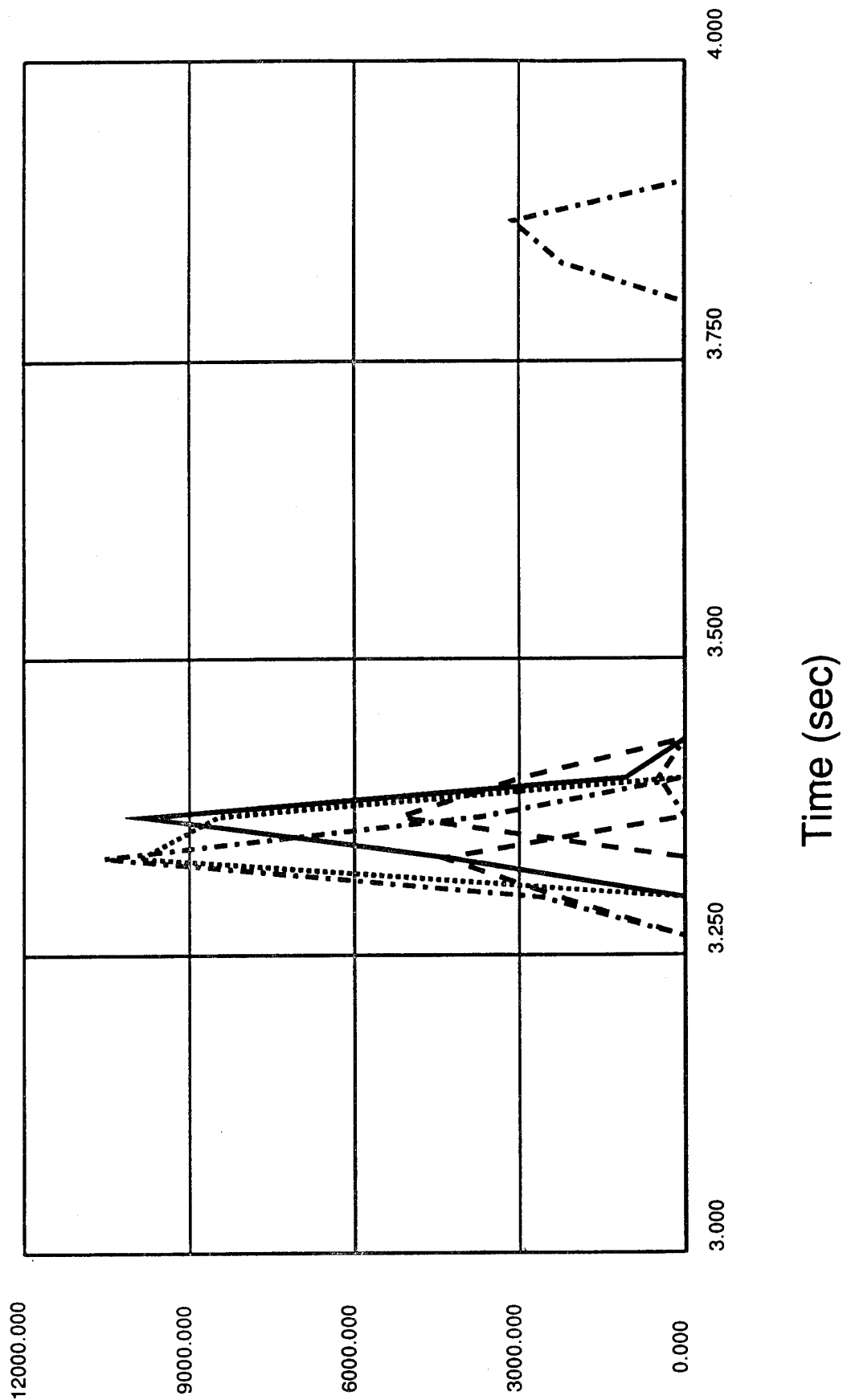
# Port Gunwale Impact Forces



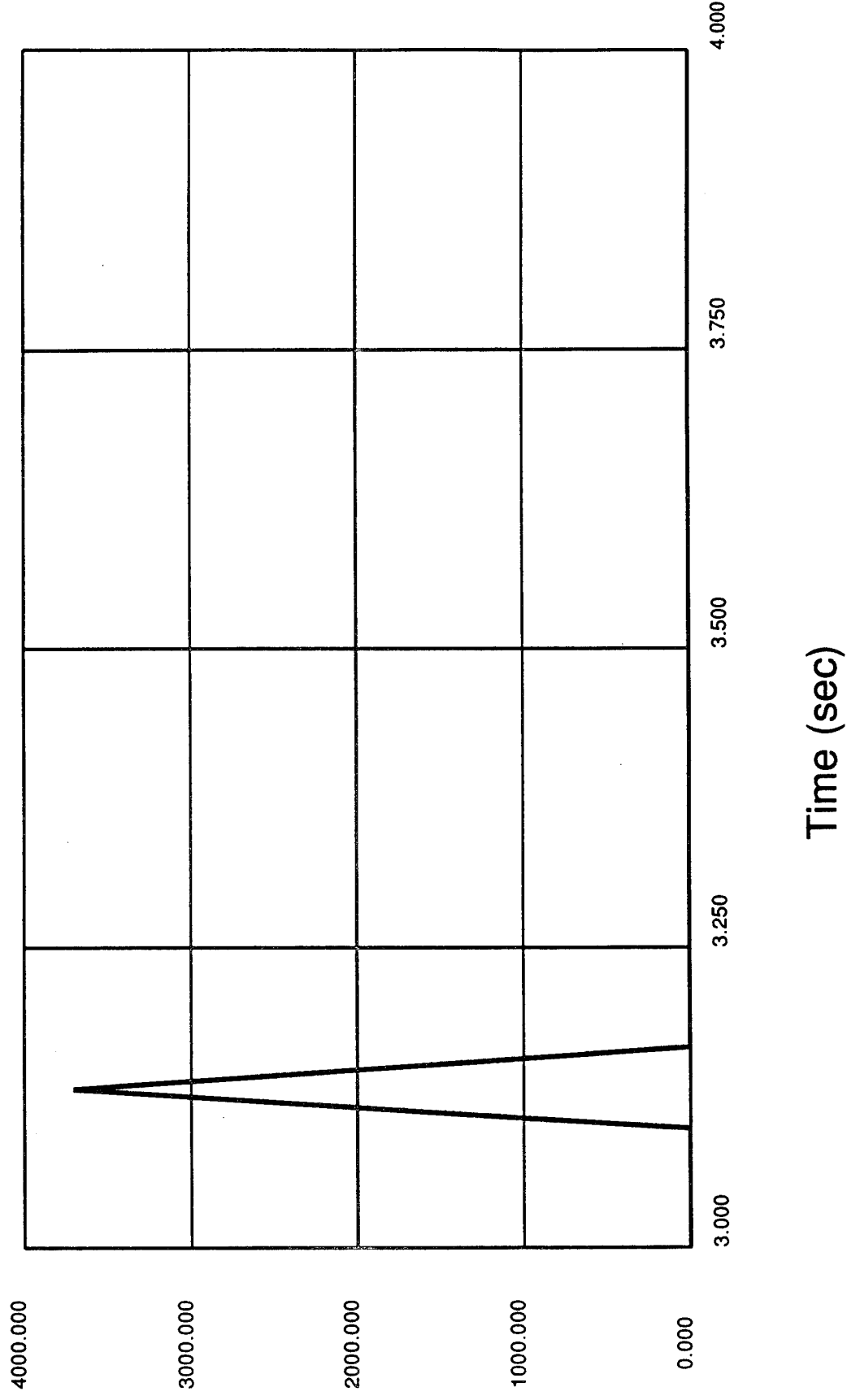
# Port China Impact Forces



# Starboard Gunwale Impact Forces

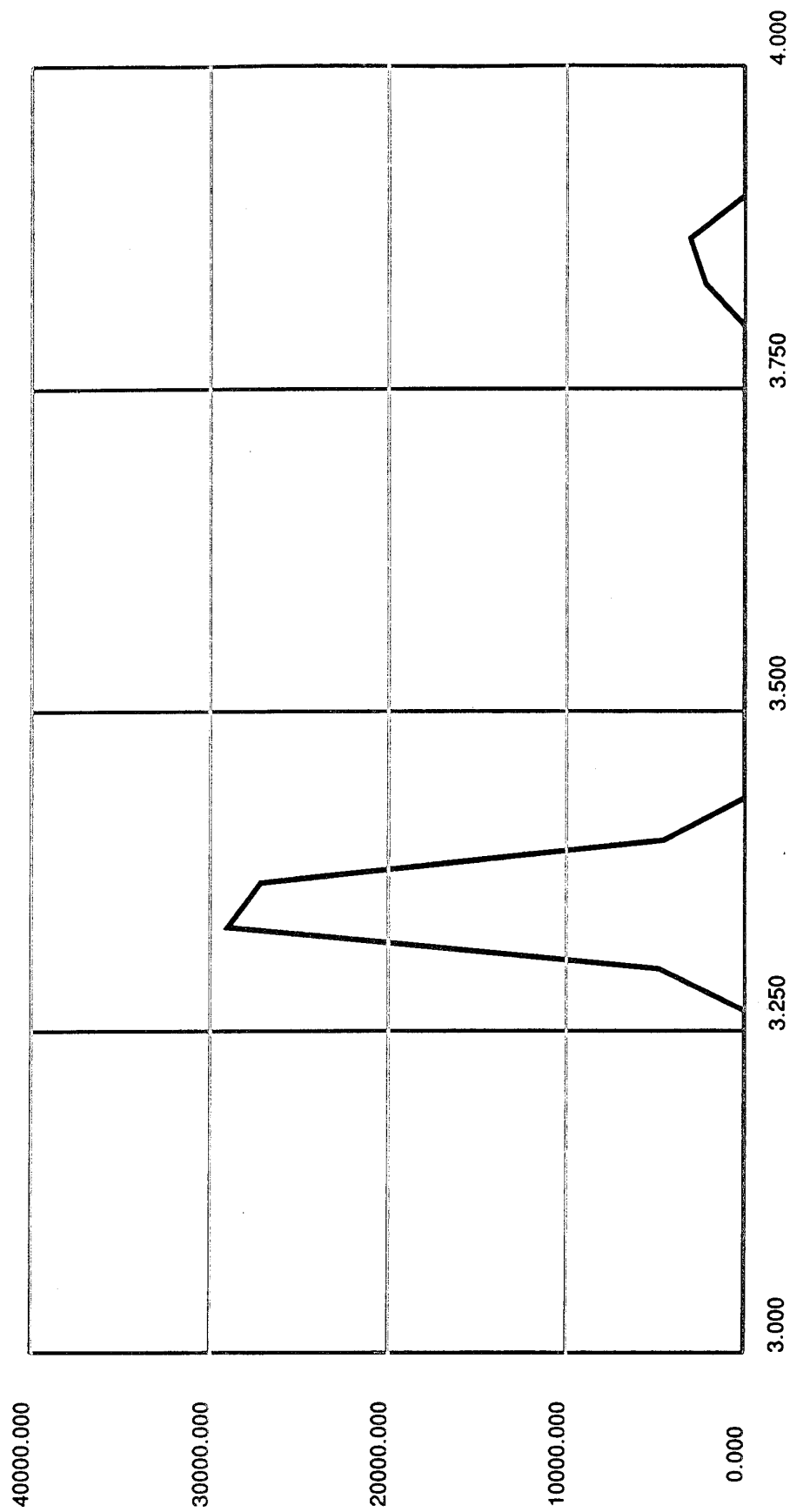


# Total Port Gunwale Impact Force



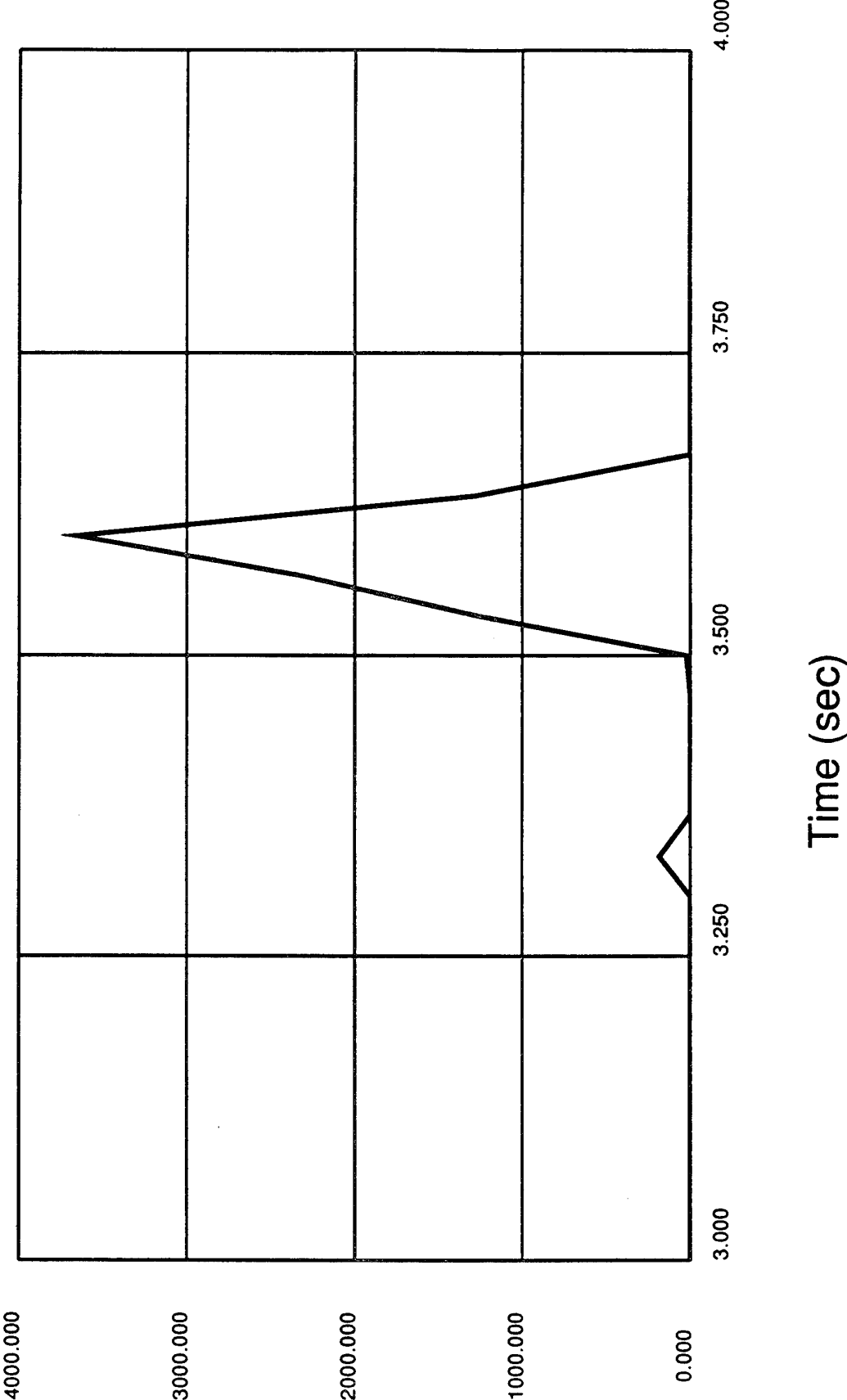


# Total Starboard Gunwale Impact Force



Time (sec)

Total Port Chine Impact Force

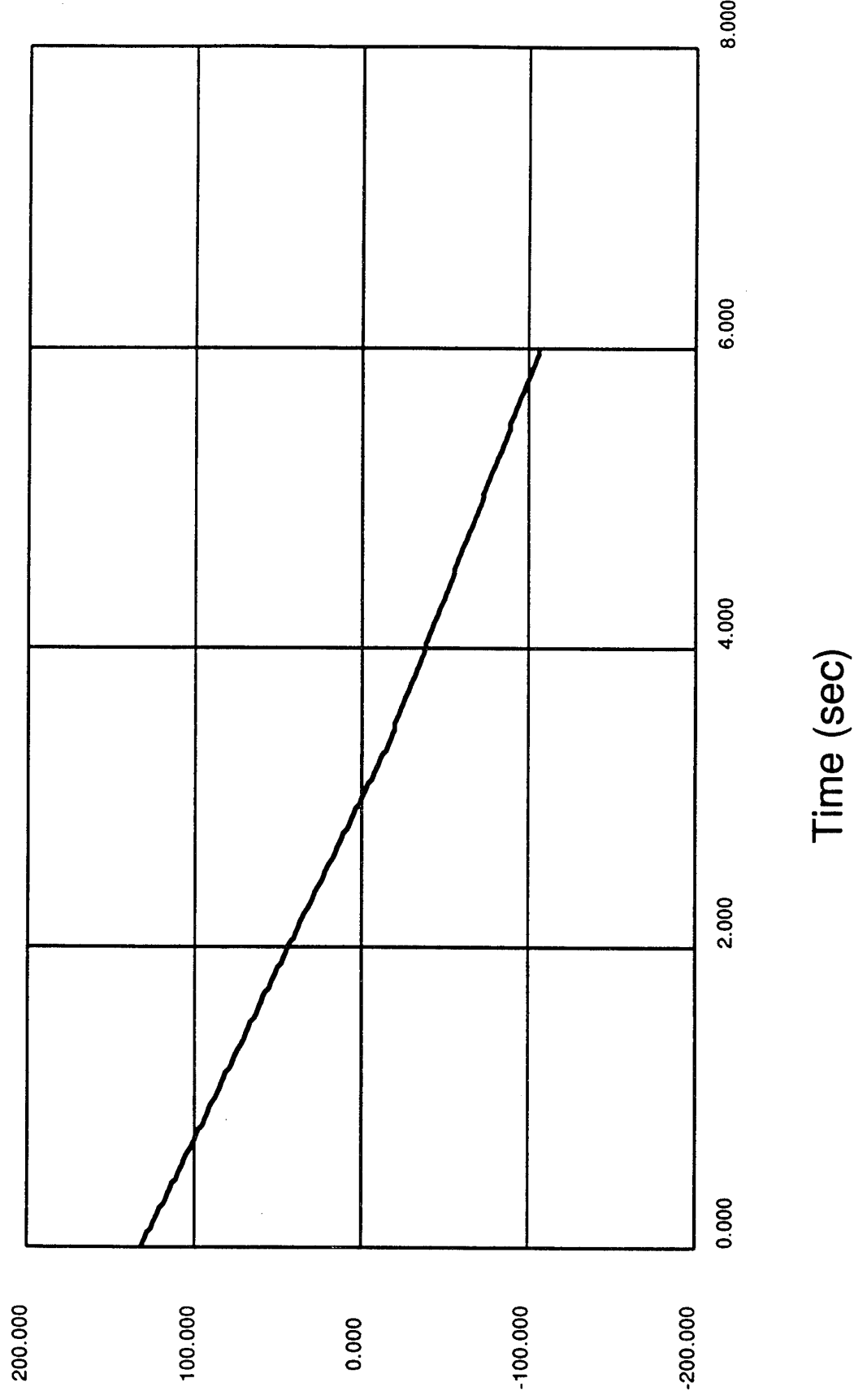


# Total Impact Force

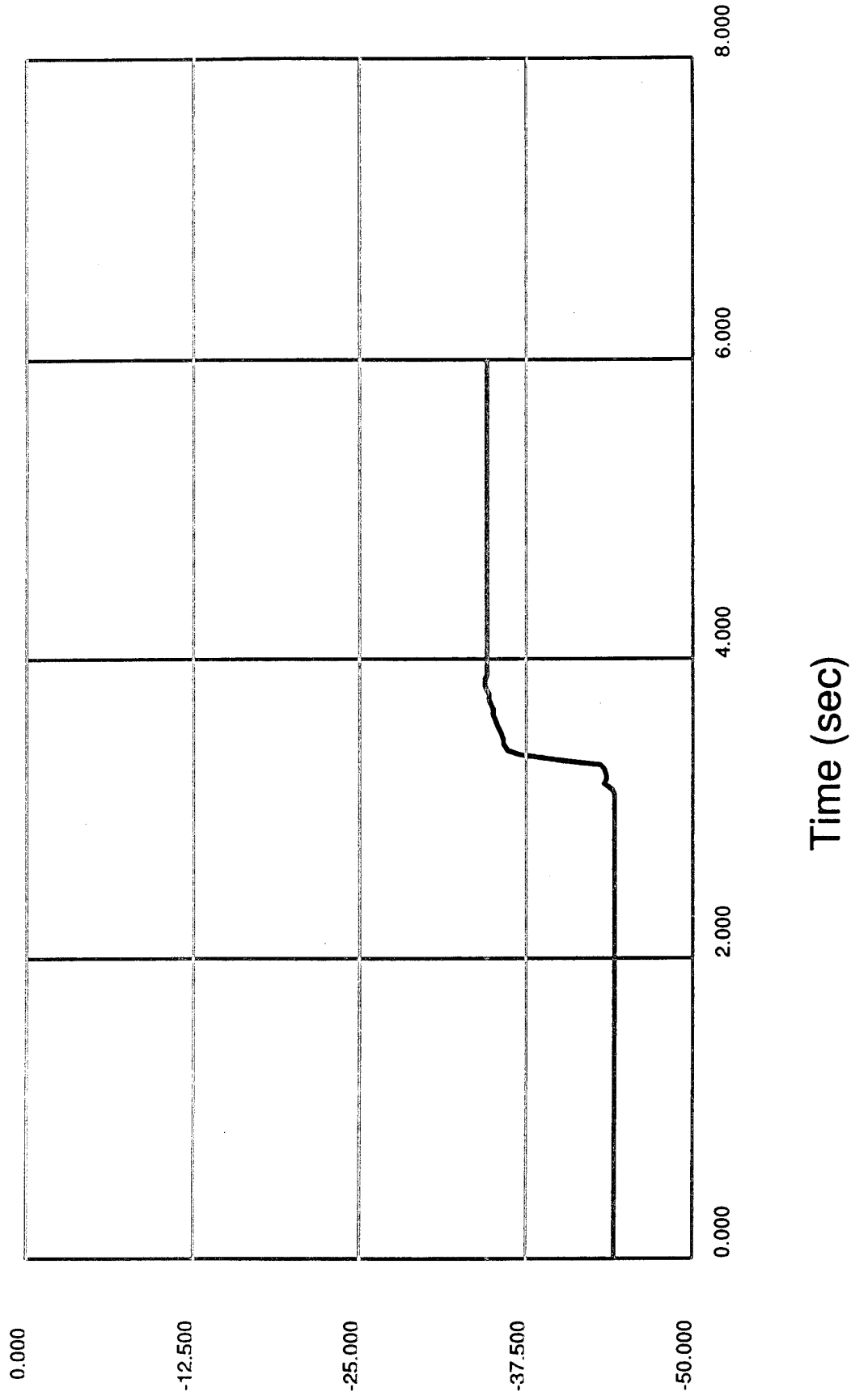


Time (sec)

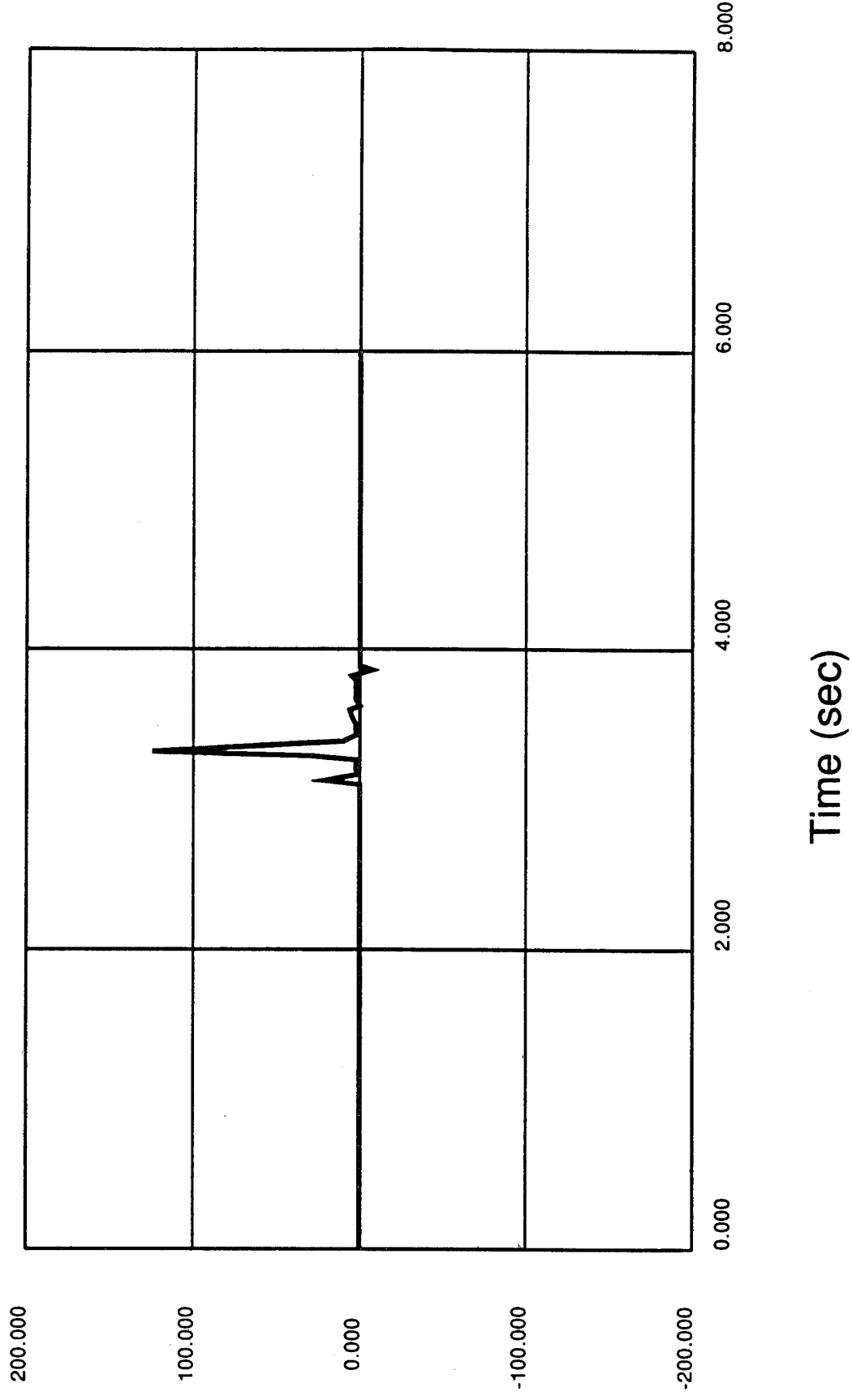
# Req 2001, Col 1, Bullet Boat Displacement



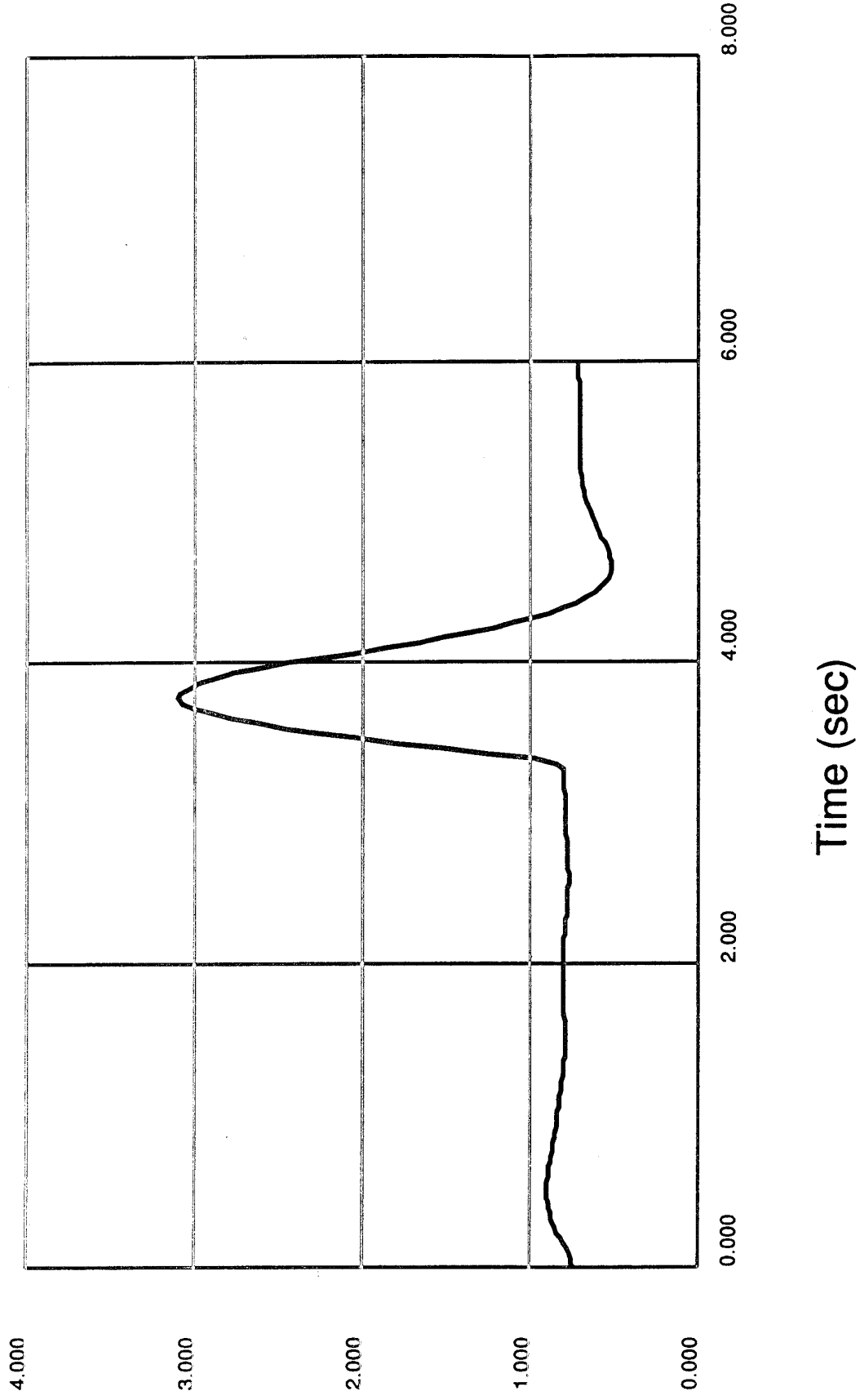
# Req 2002, Col 1, Bullet Boat Velocity



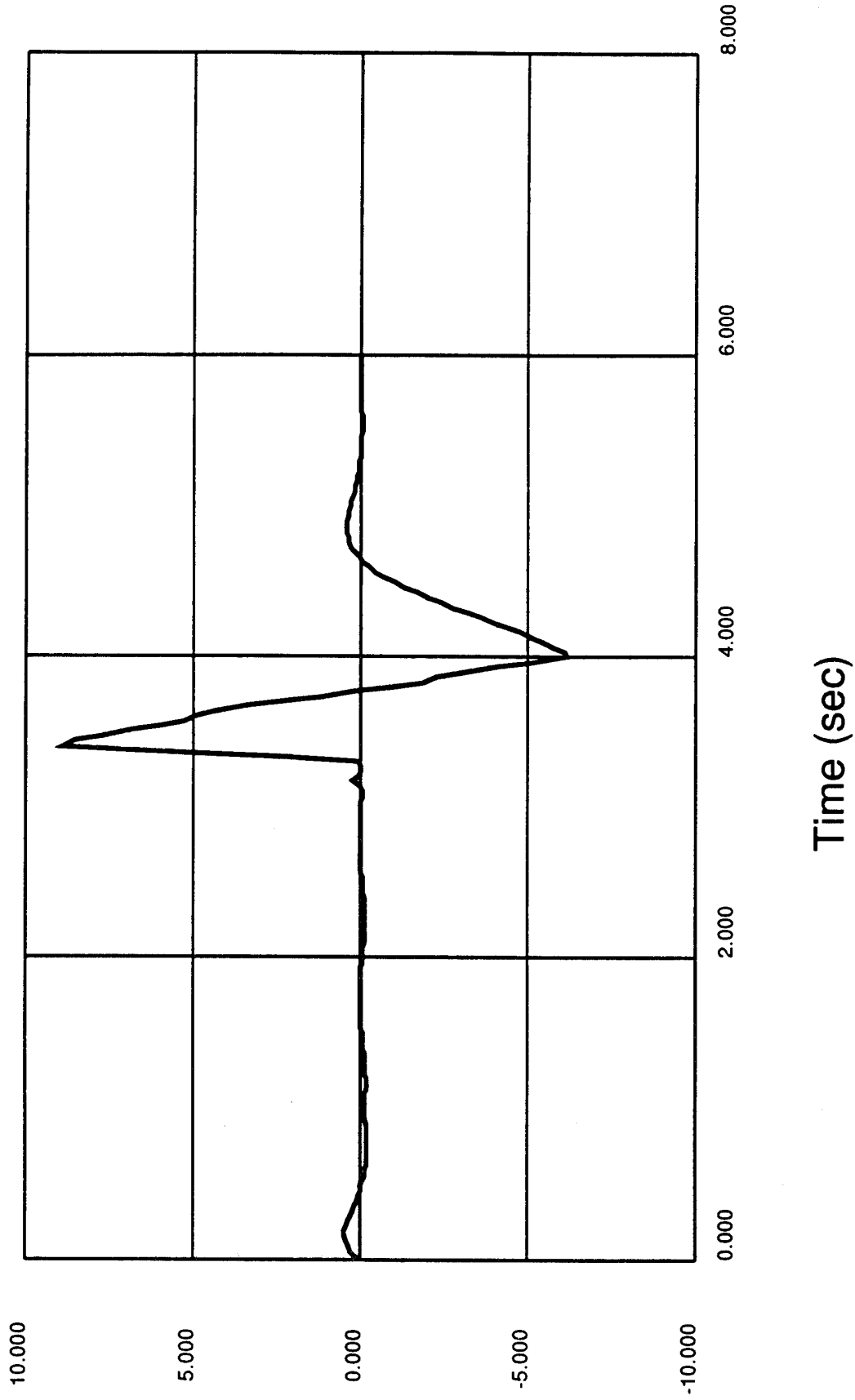
# Req 2003, Col 1, Bullet Boat Acceleration



# Req 2001, Col 3, Bullet Boat Displacement

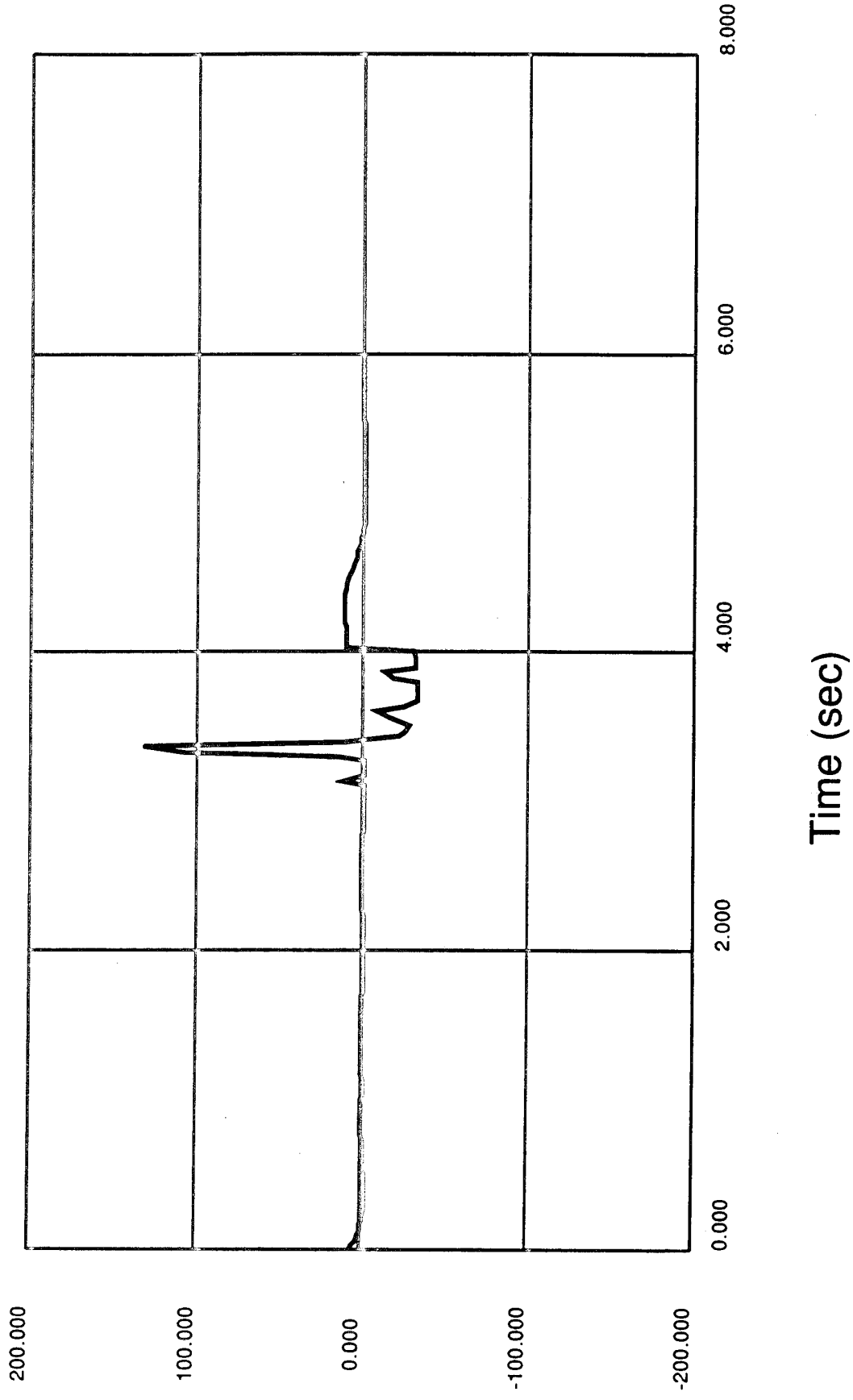


# Req 2002, Col 3, Bullet Boat Velocity

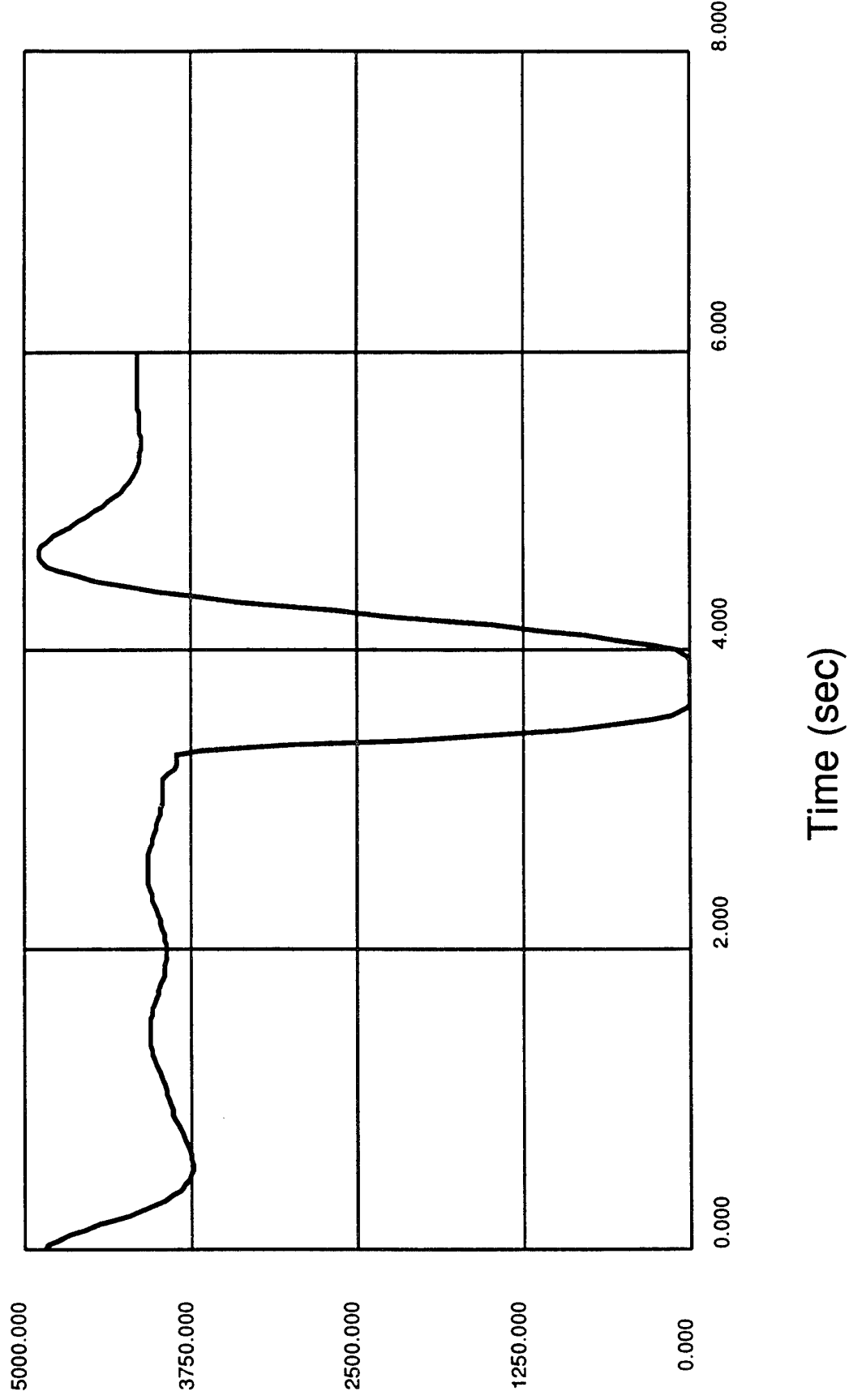




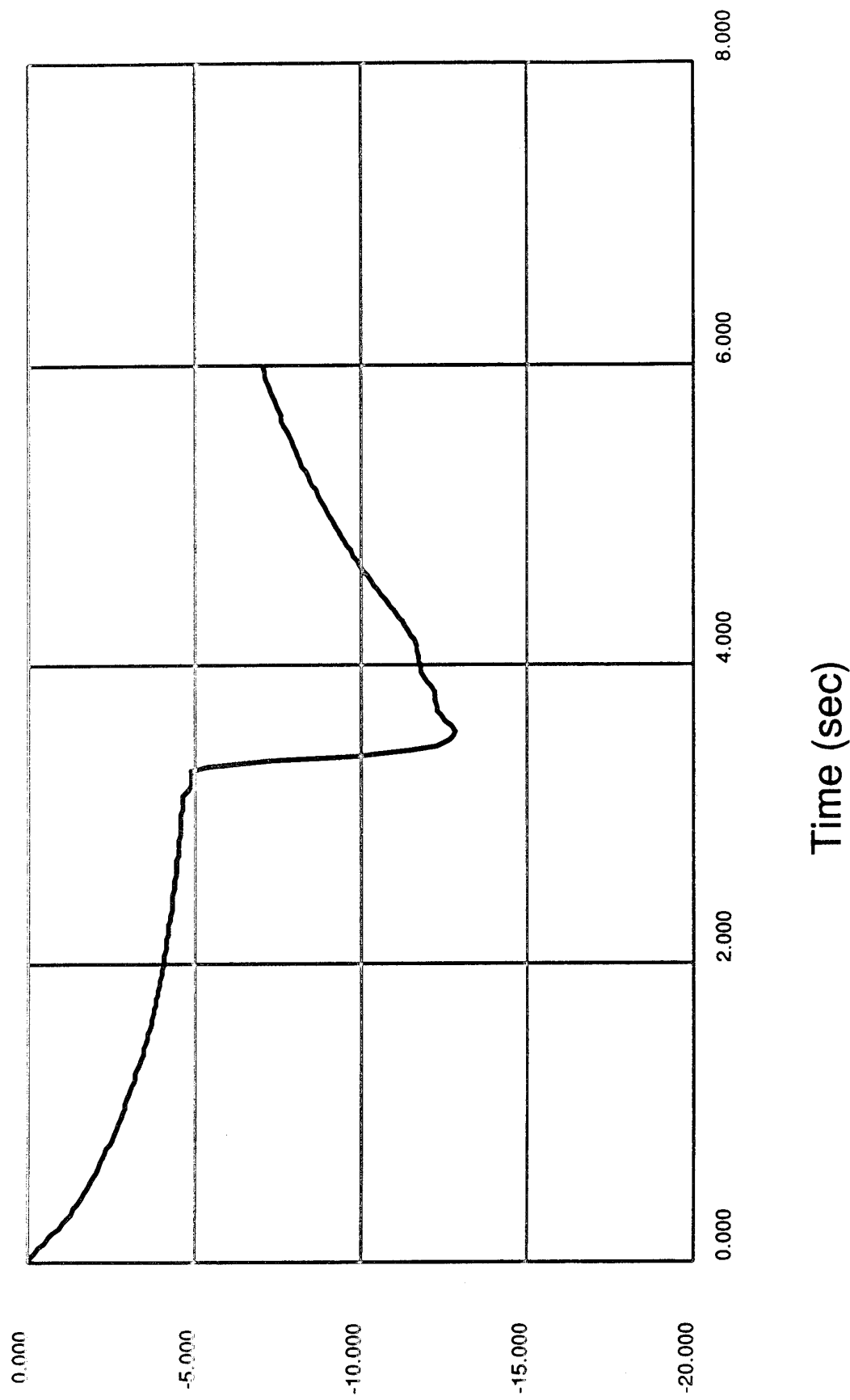
# Req 2003, Col 3, Bullet Boat Acceleration



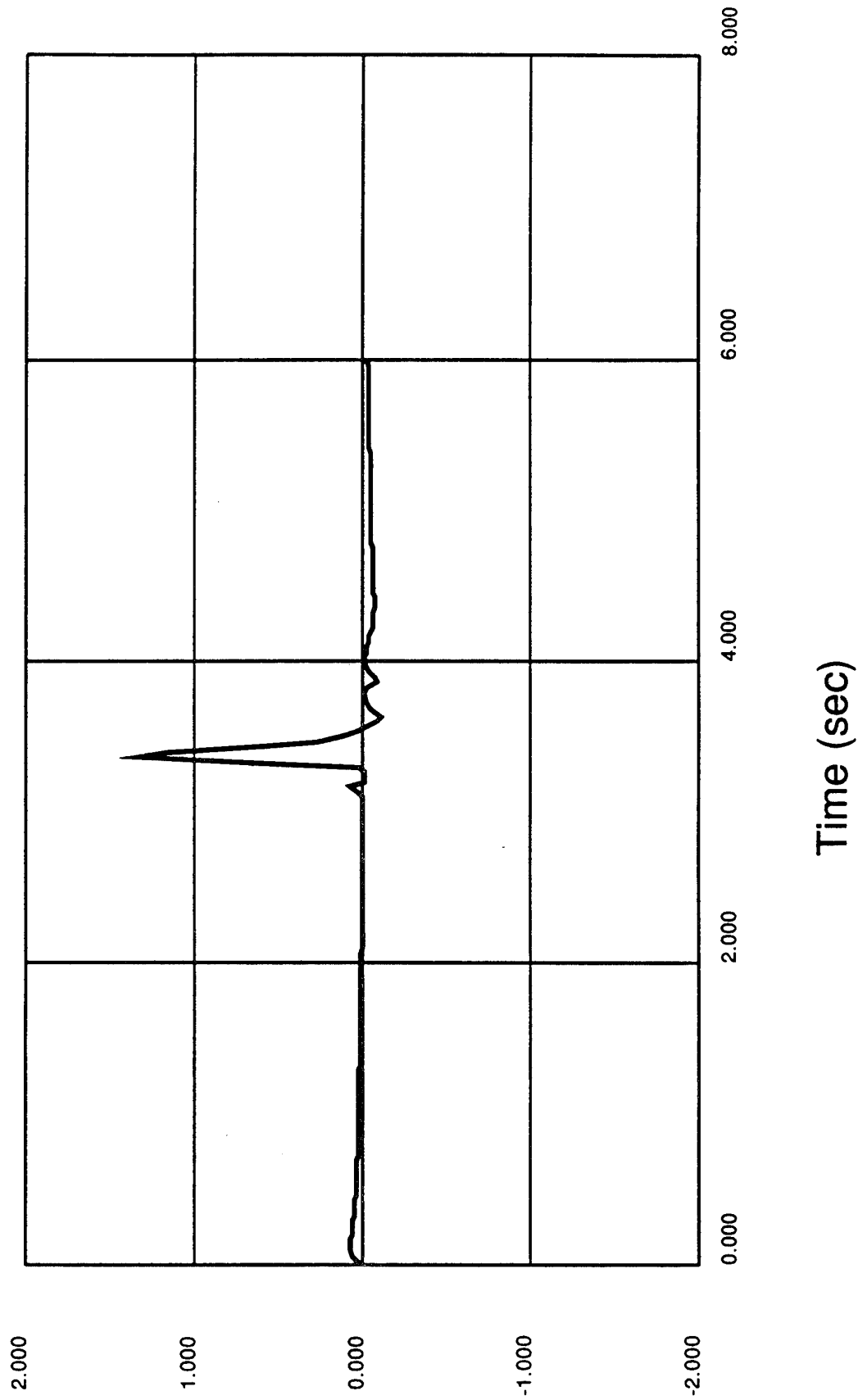
# Req 2004, Col 3, Bullet Boat Forces



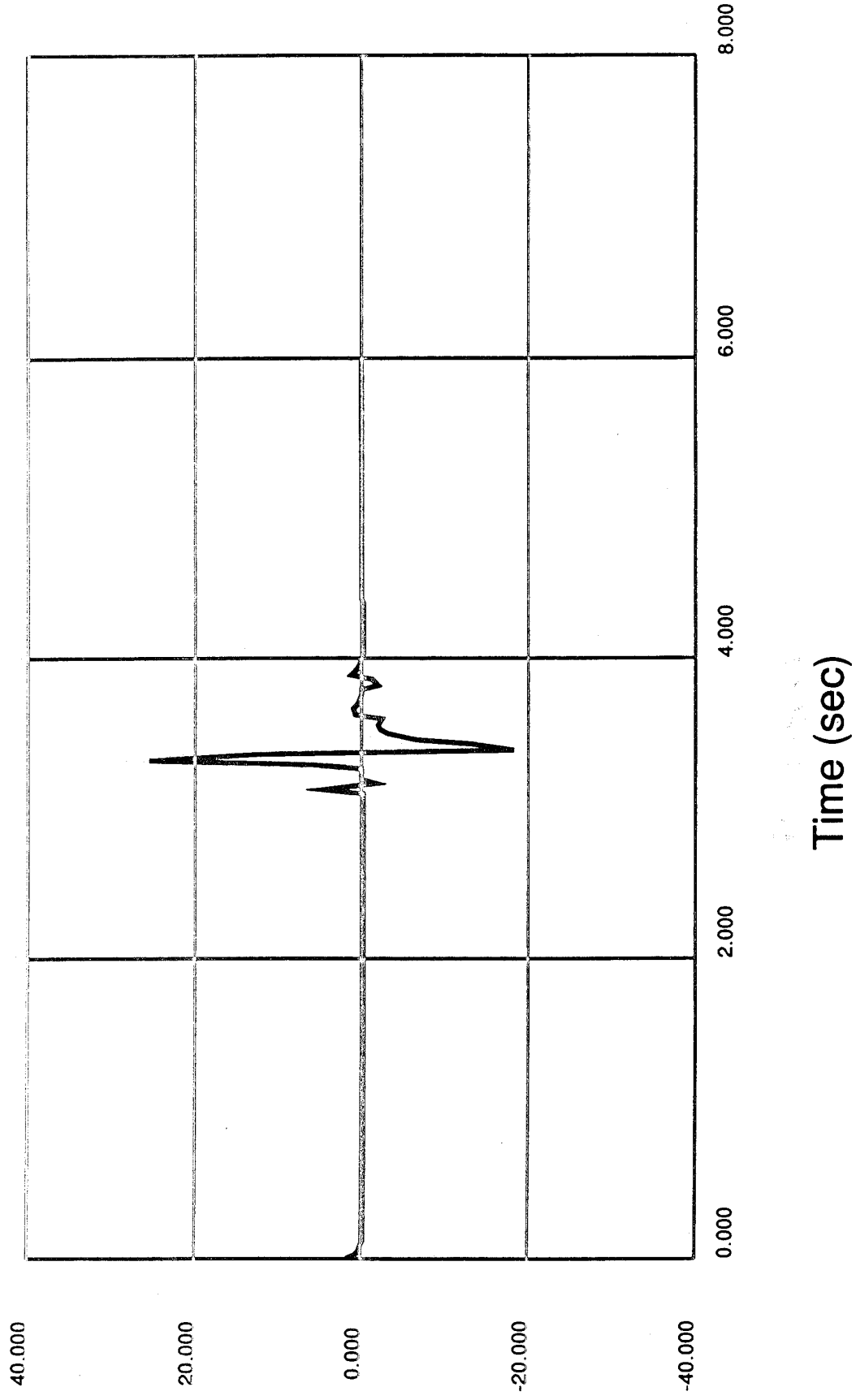
# Req 2001, Col 5, Bullet Boat Displacement



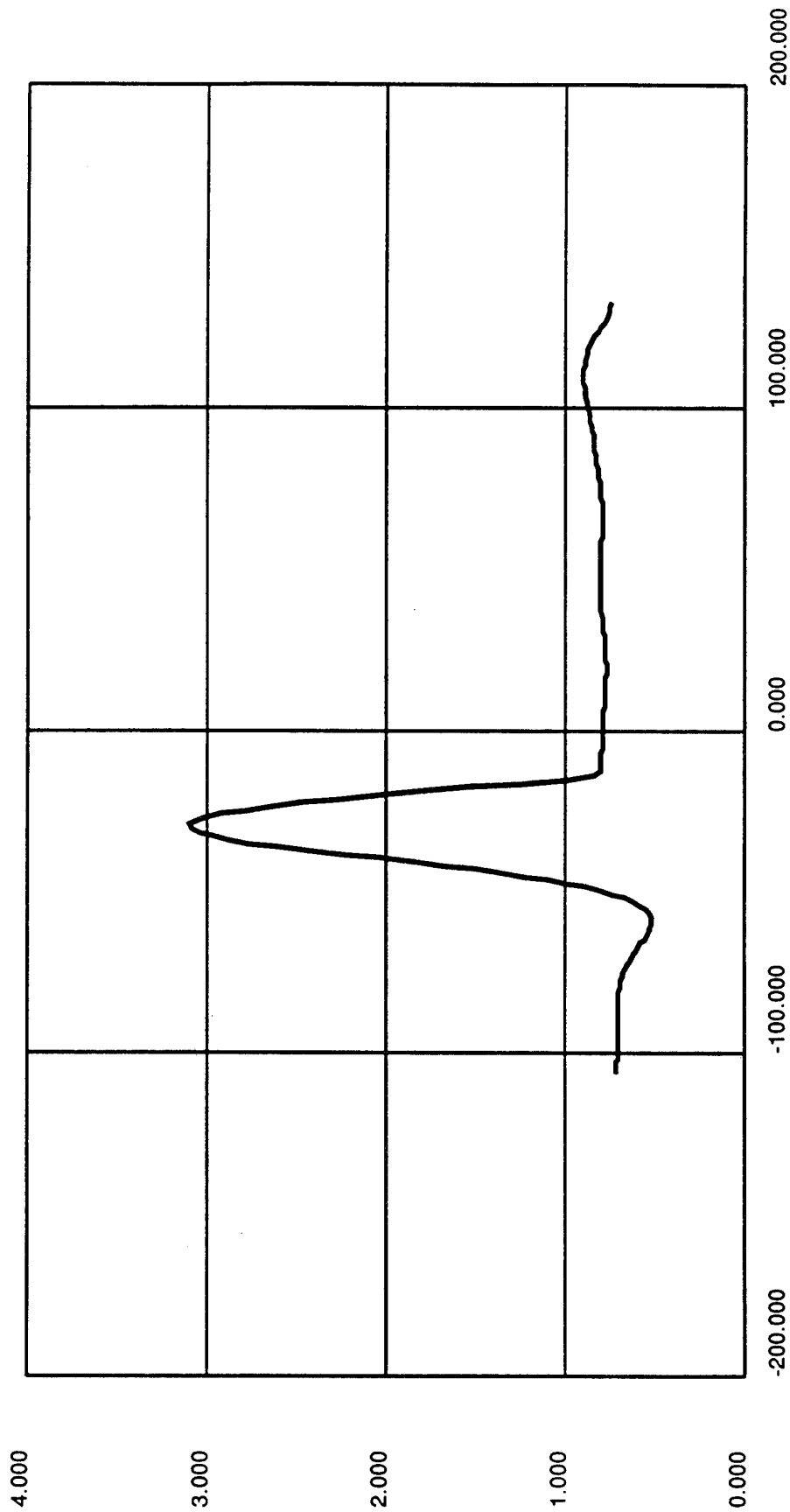
# Req 2002, Col 5, Bullet Boat Velocity



# Req 2003, Col 5, Bullet Boat Acceleration

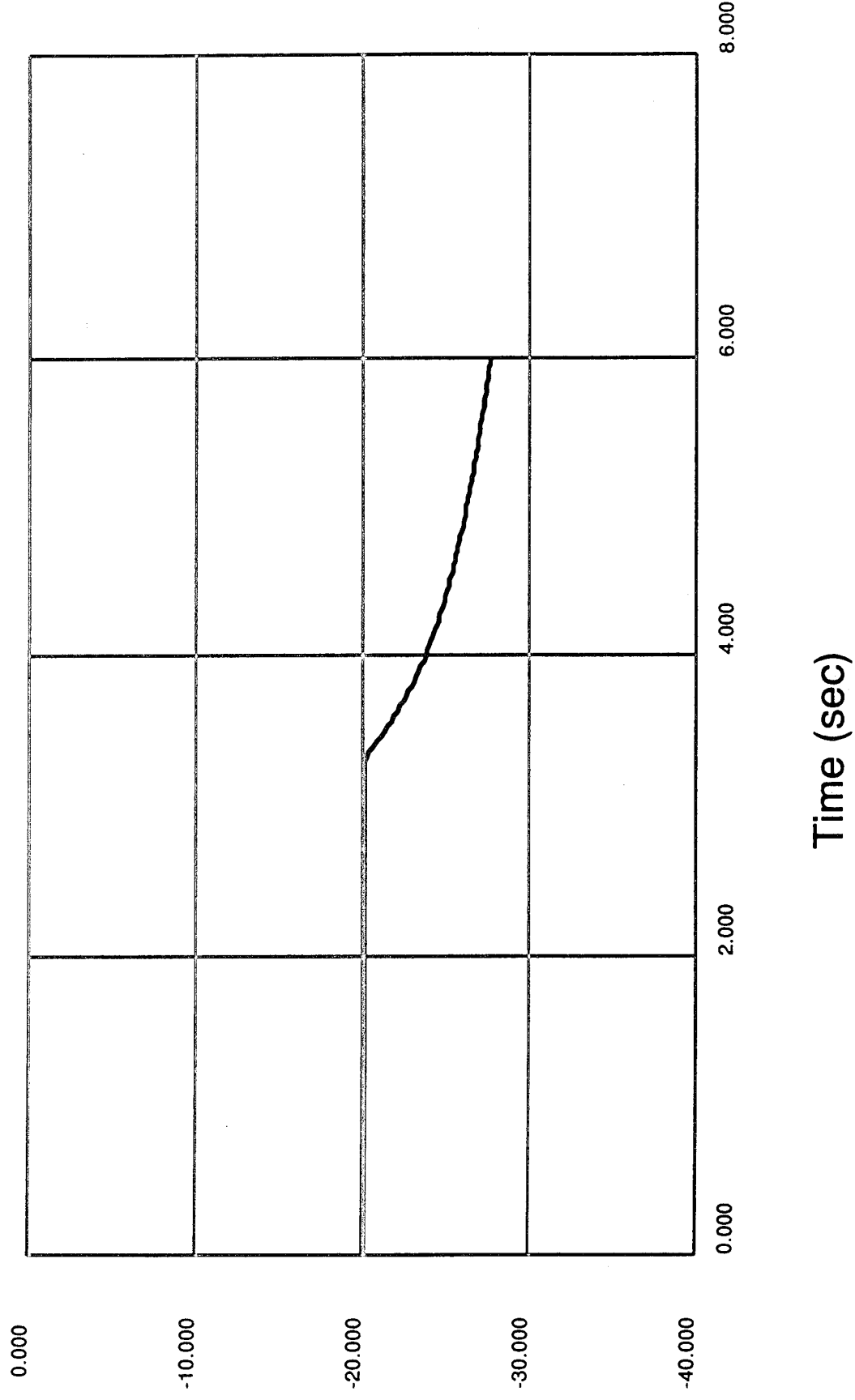


Req 2001, Col 1, Bullet Boat Displacement  
Req 2001, Col 3, Bullet Boat Displacement

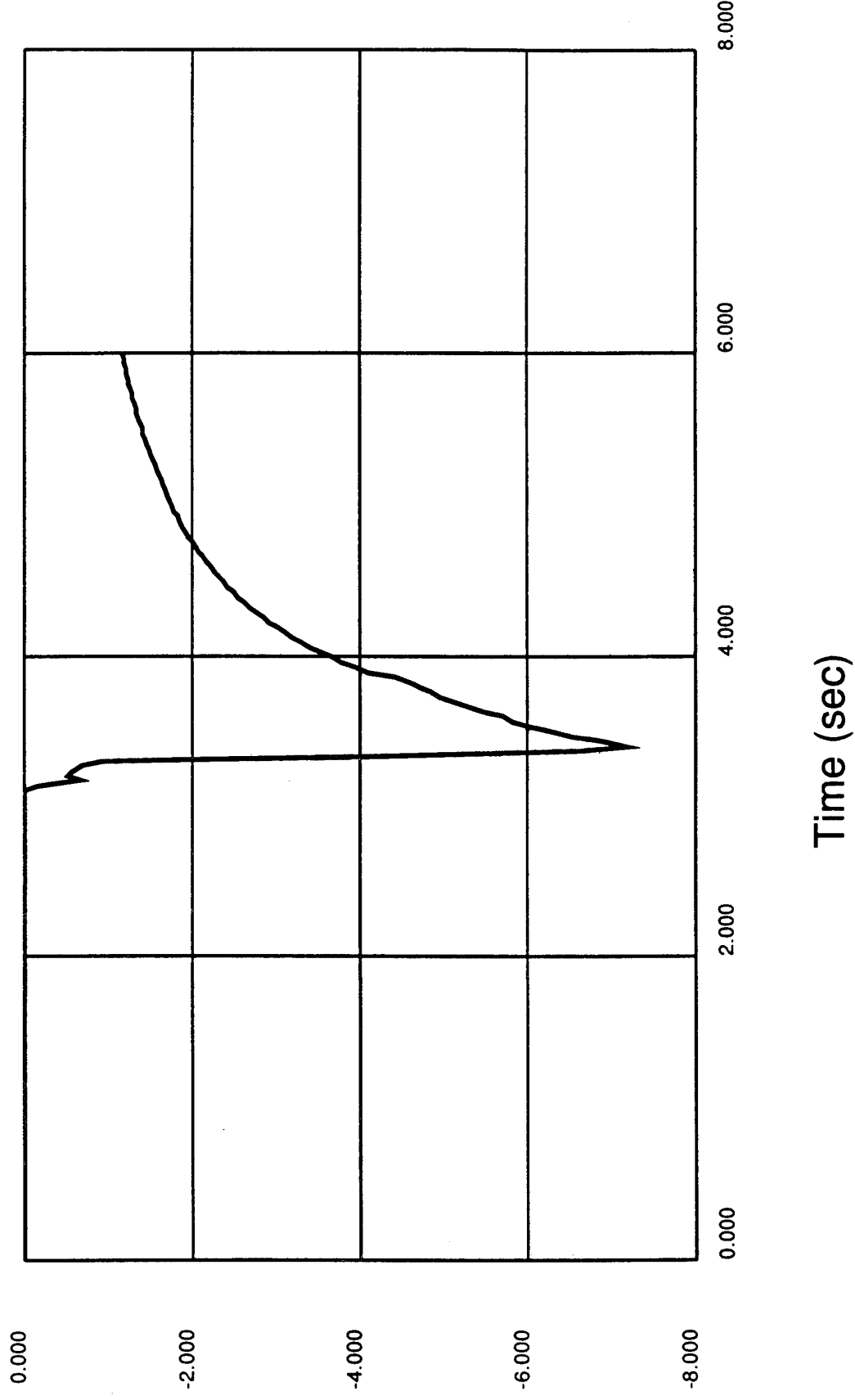


Bullet Boat CG Trajectory

# Req 3001, Col 1, Target Boat Displacement

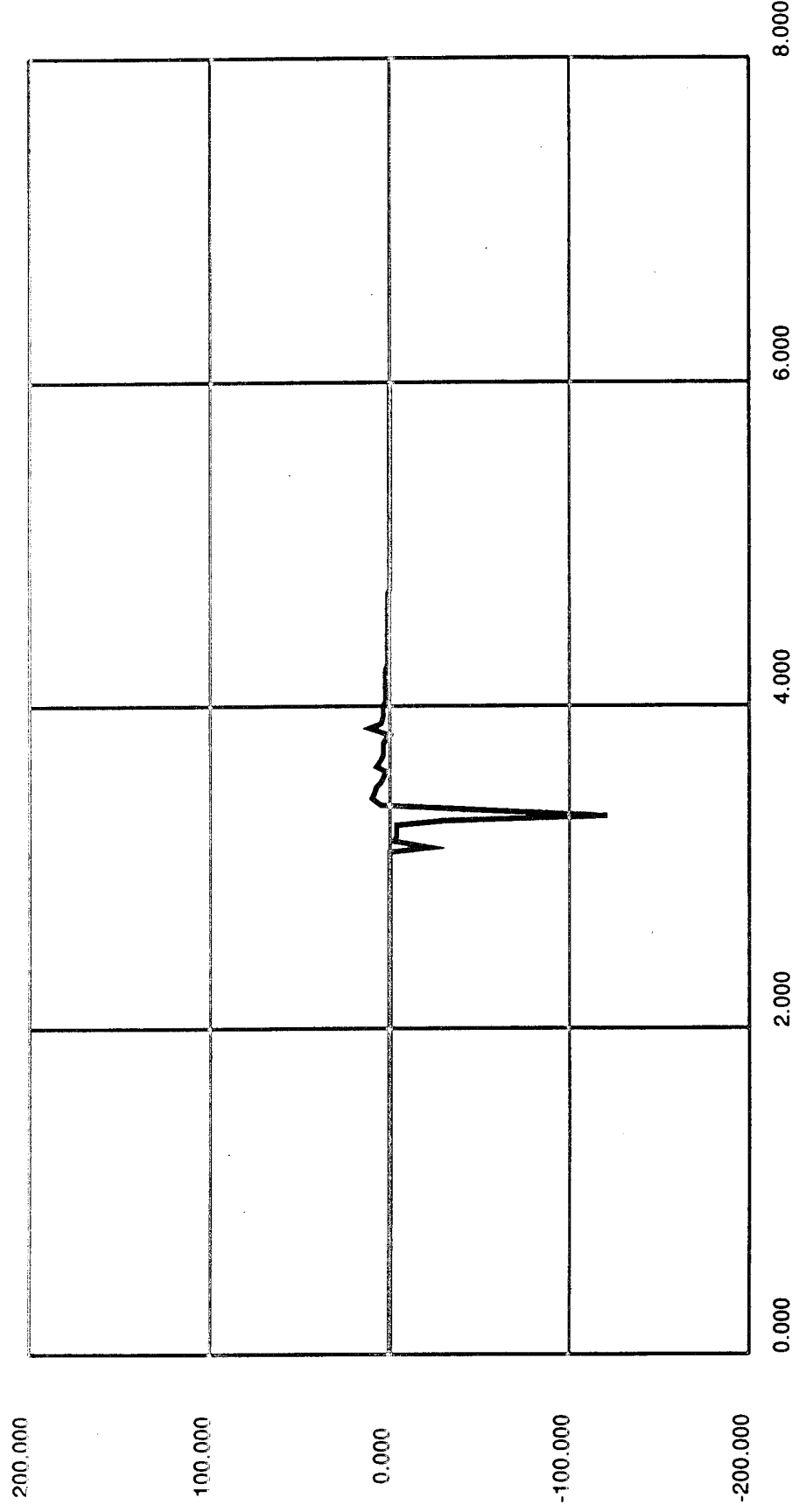


# Req 3002, Col 1, Target Boat Velocity



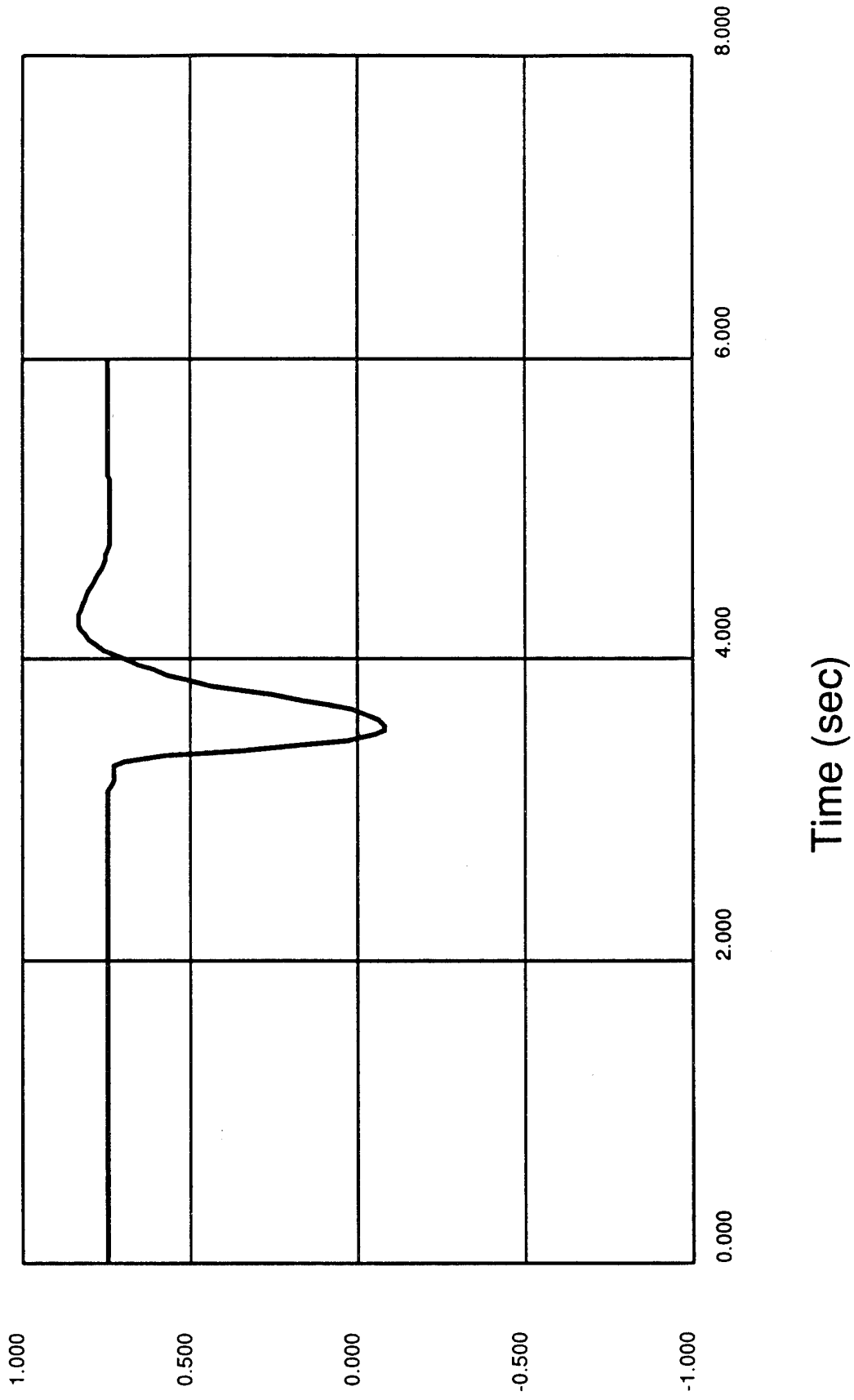


# Req 3003, Col 1, Target Boat Acceleration

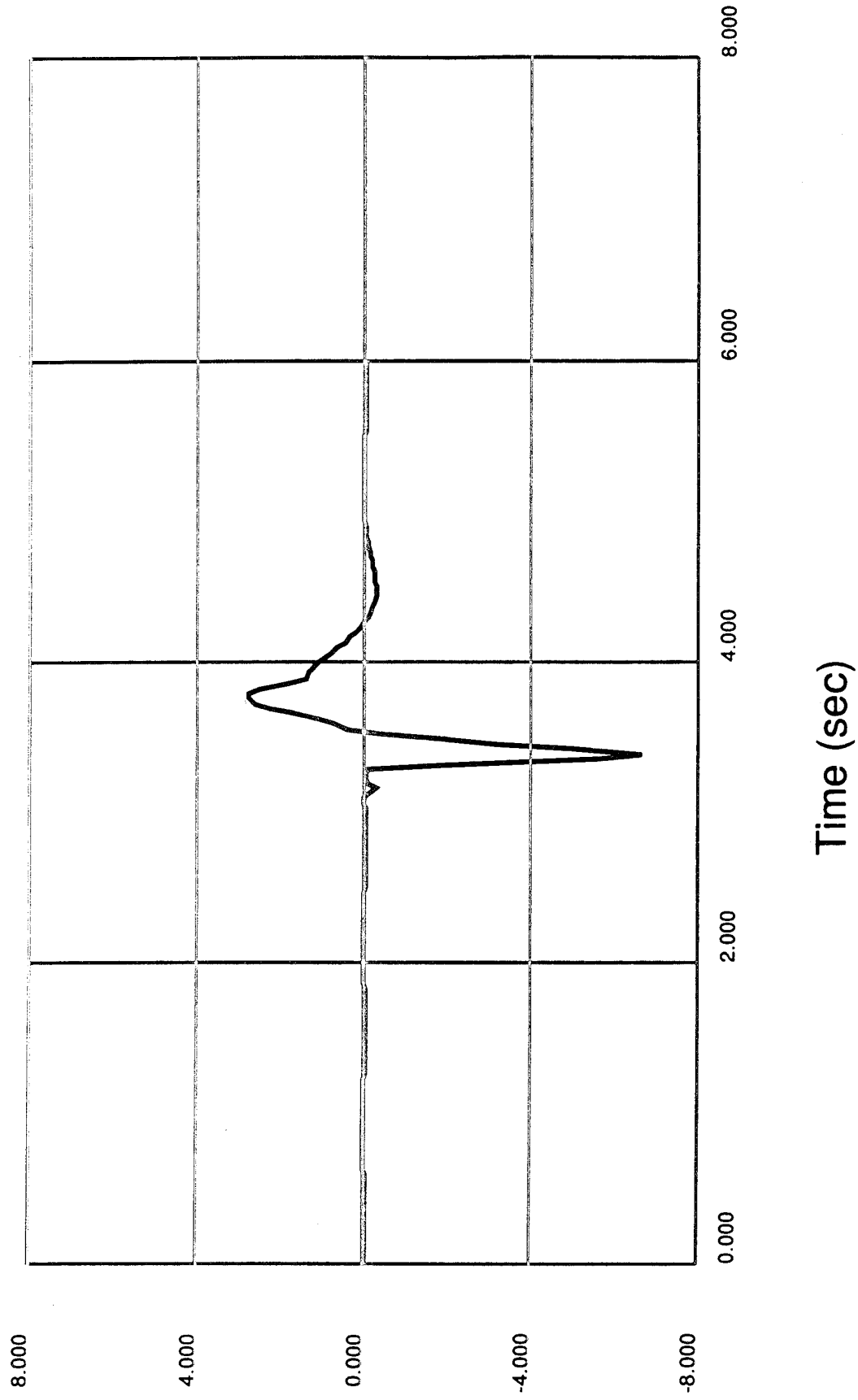


Time (sec)

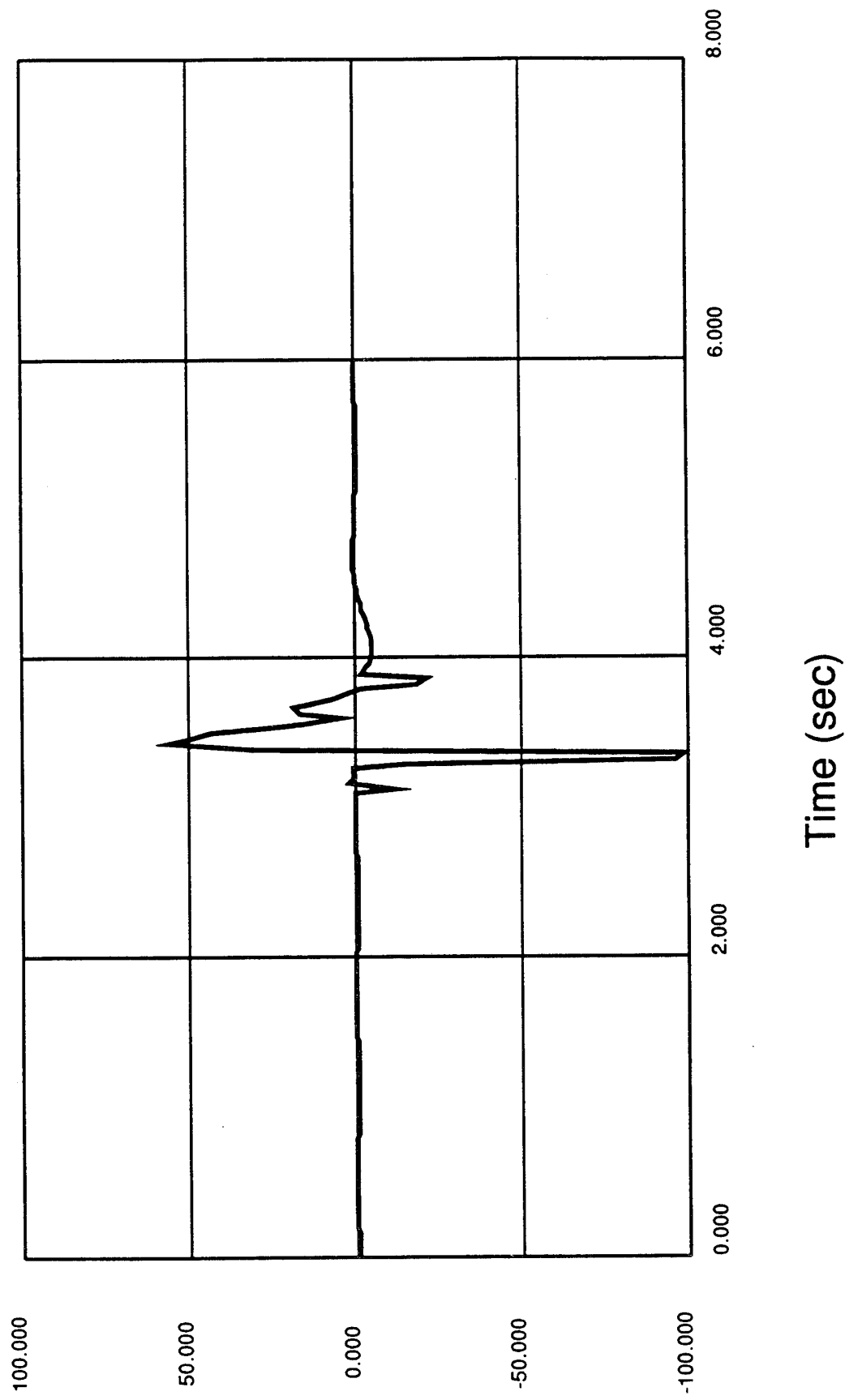
# Req 3001, Col 3, Target Boat Displacement



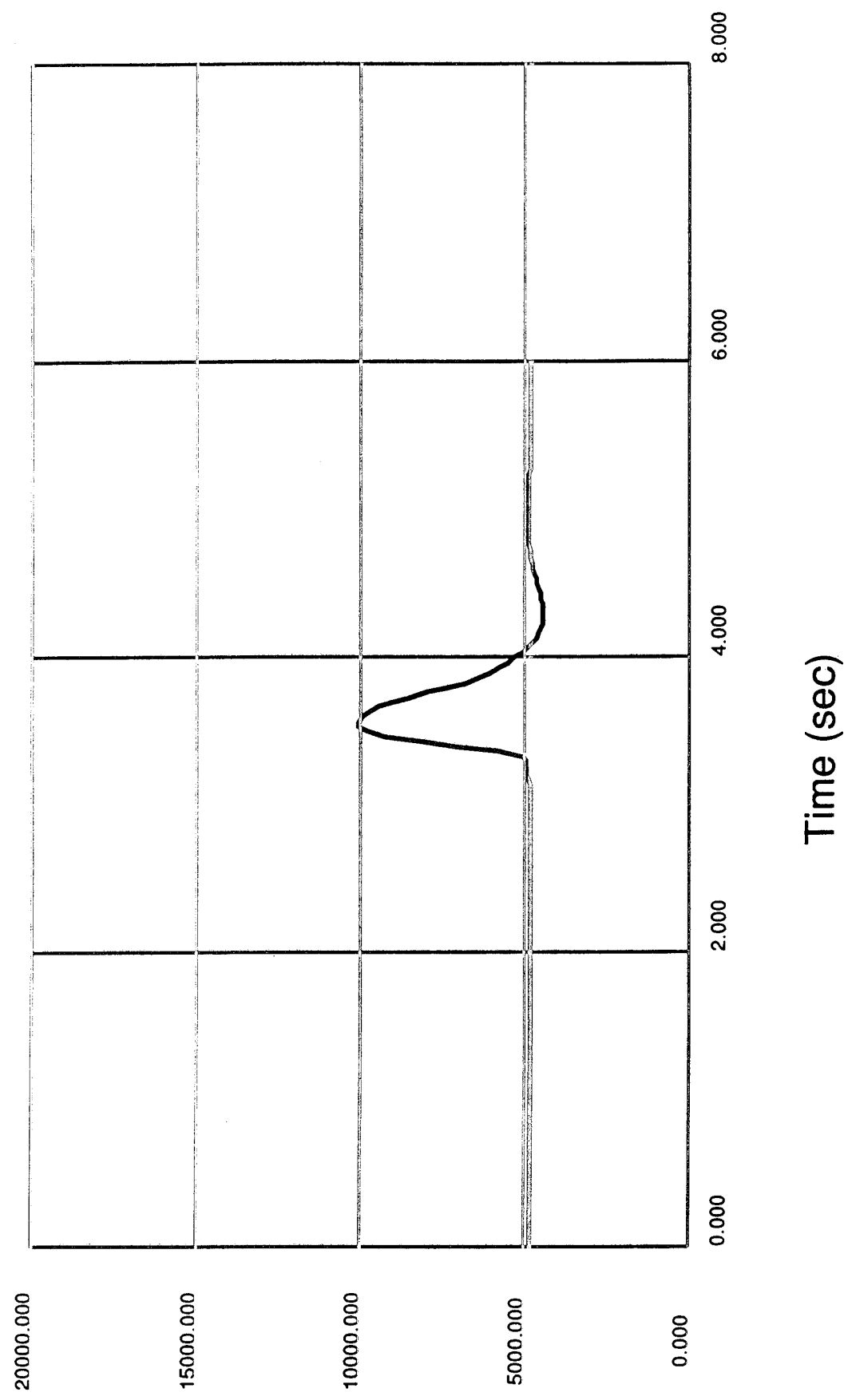
# Req 3002, Col 3, Target Boat Velocity



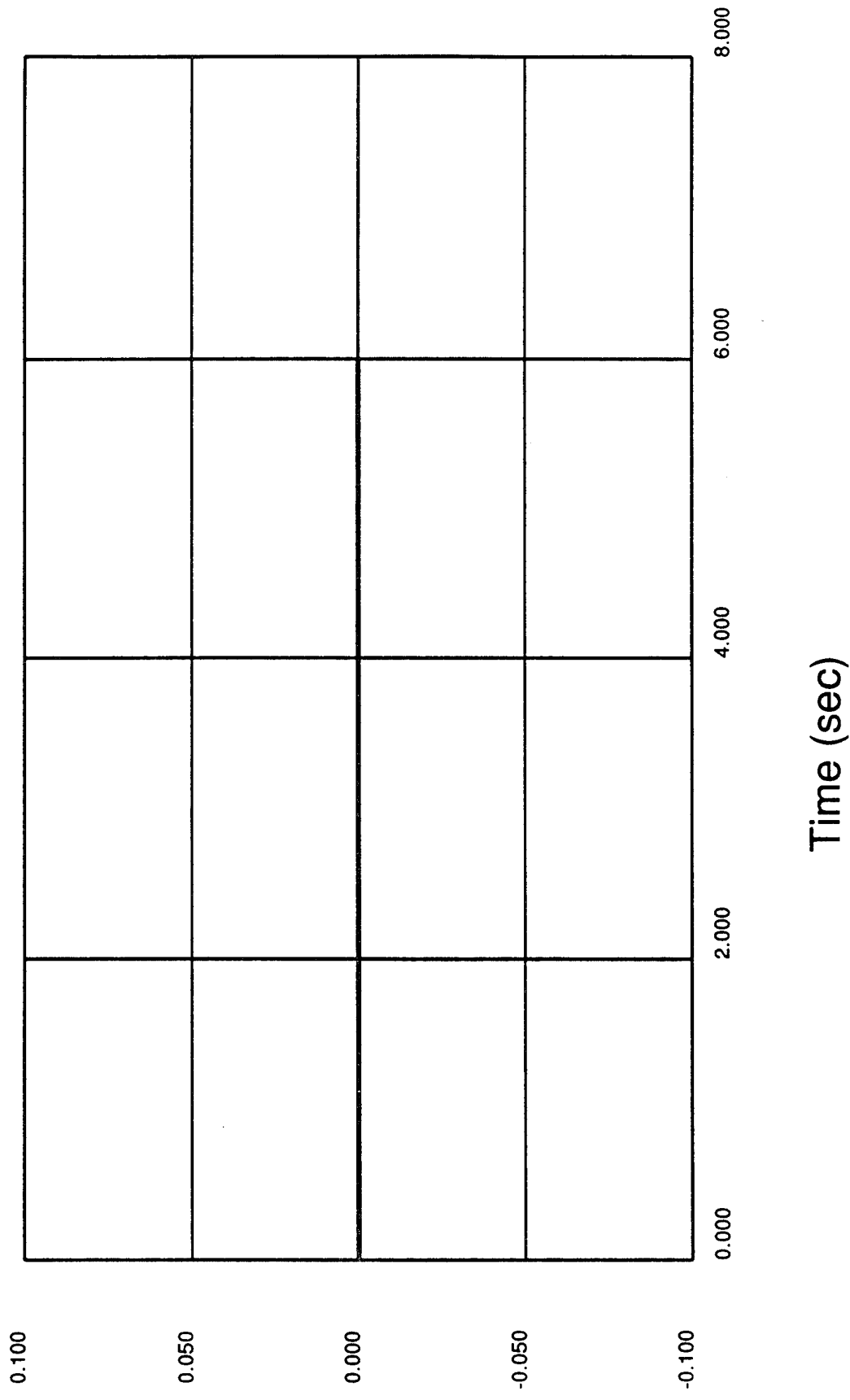
# Req 3003, Col 3, Target Boat Acceleration



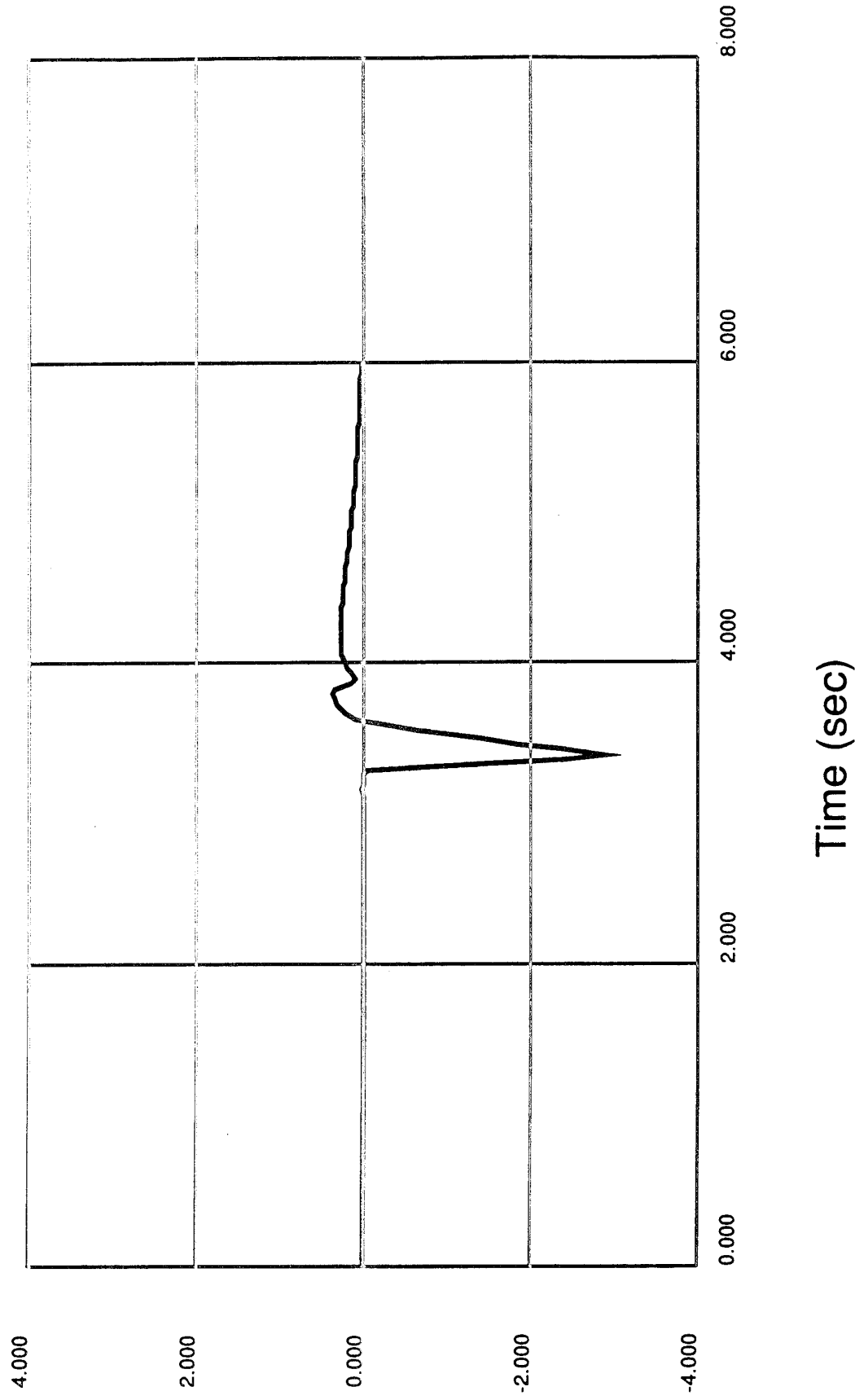
# Req 3004, Col 3, Target Boat Forces



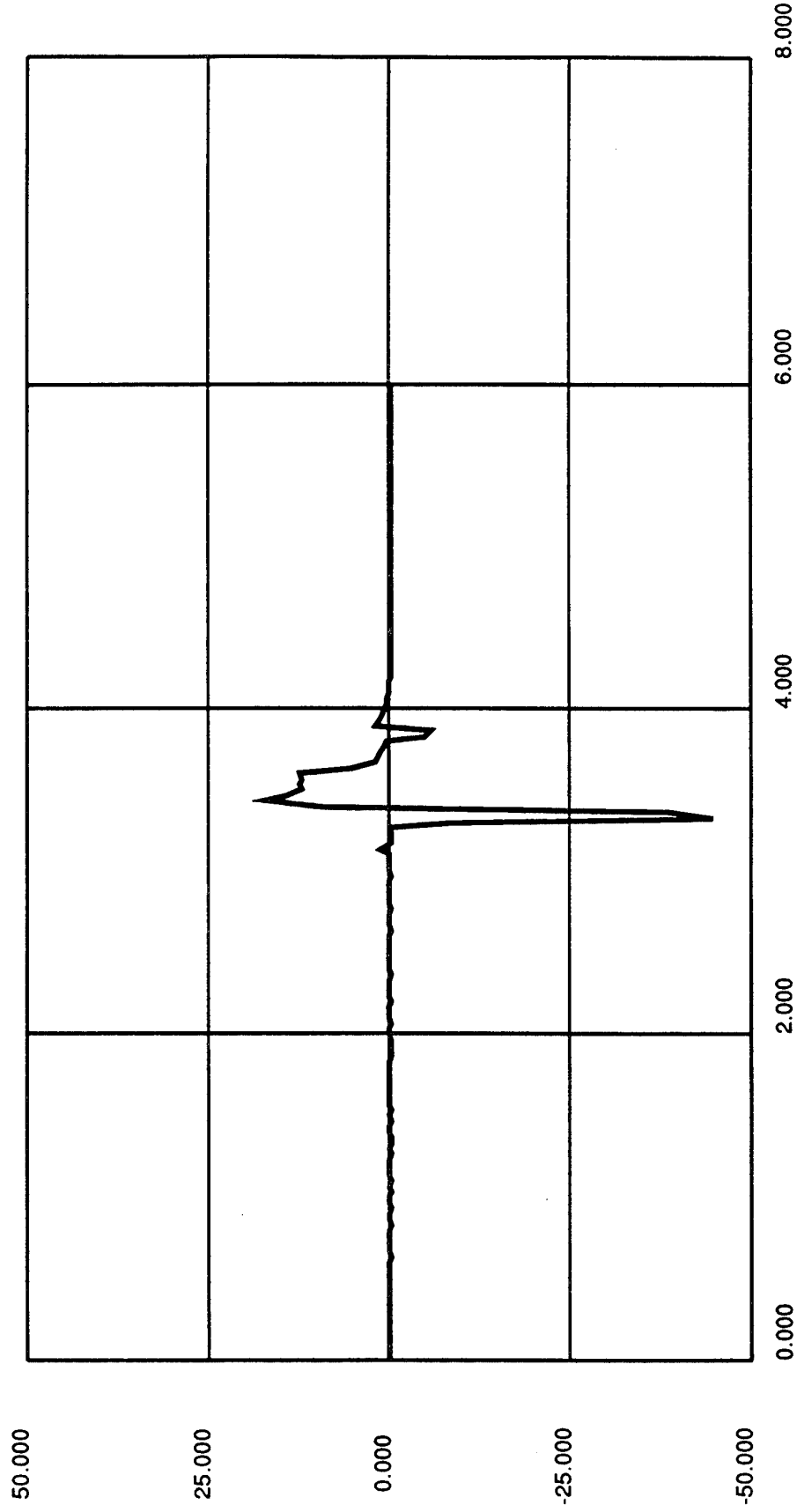
# Req 3001, Col 5, Target Boat Displacement



# Req 3002, Col 5, Target Boat Velocity



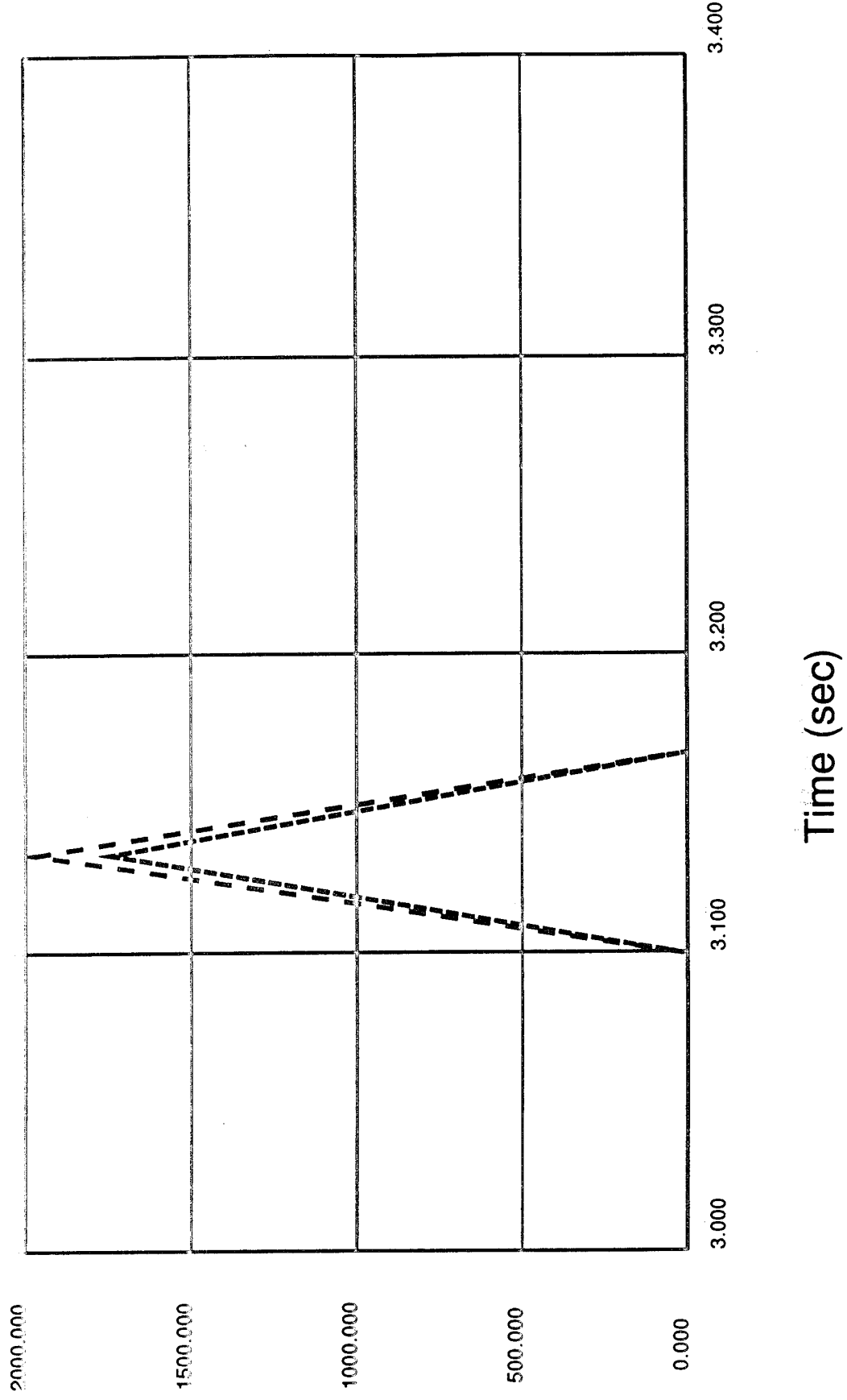
# Req 3003, Col 5, Target Boat Acceleration



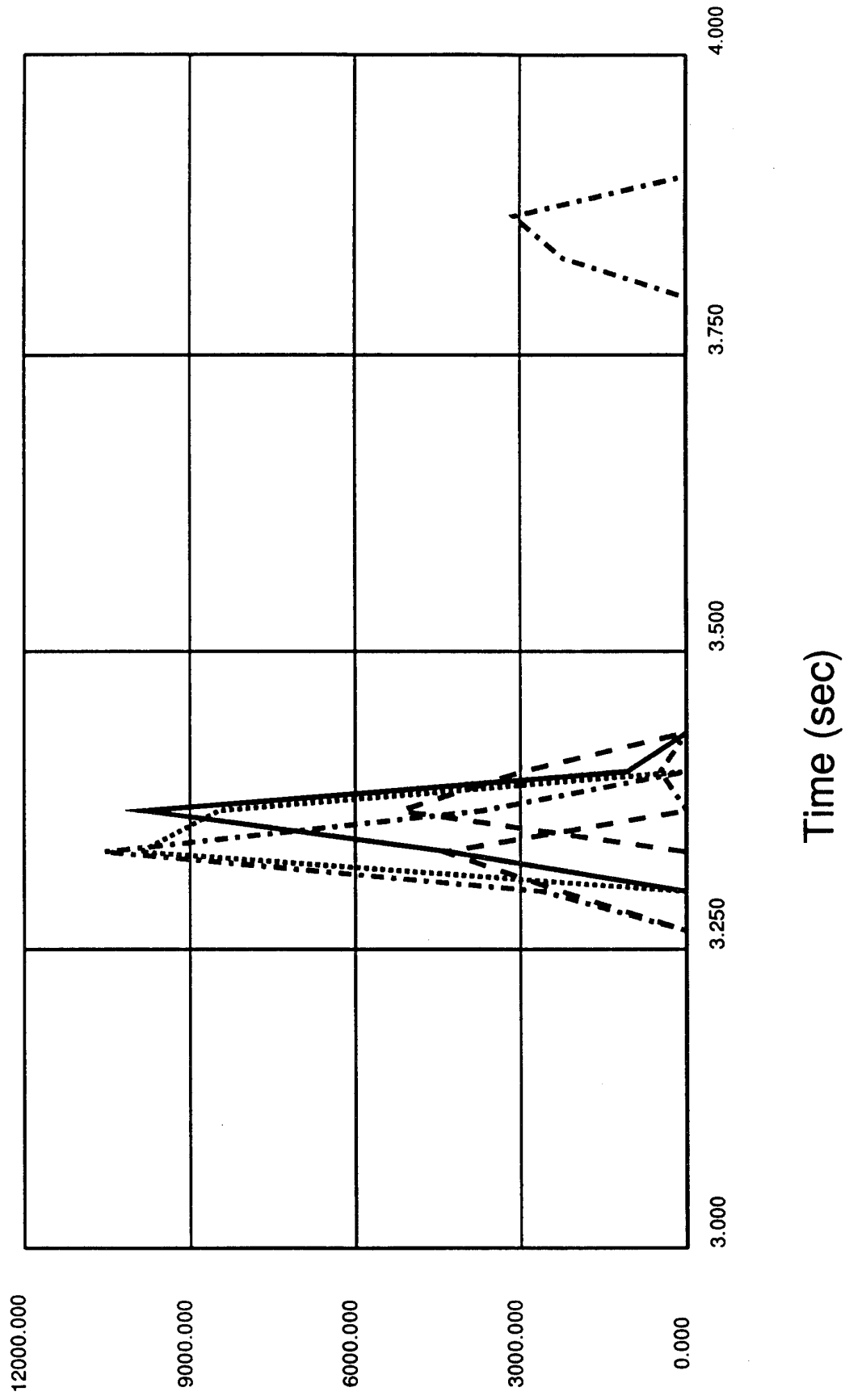
Time (sec)



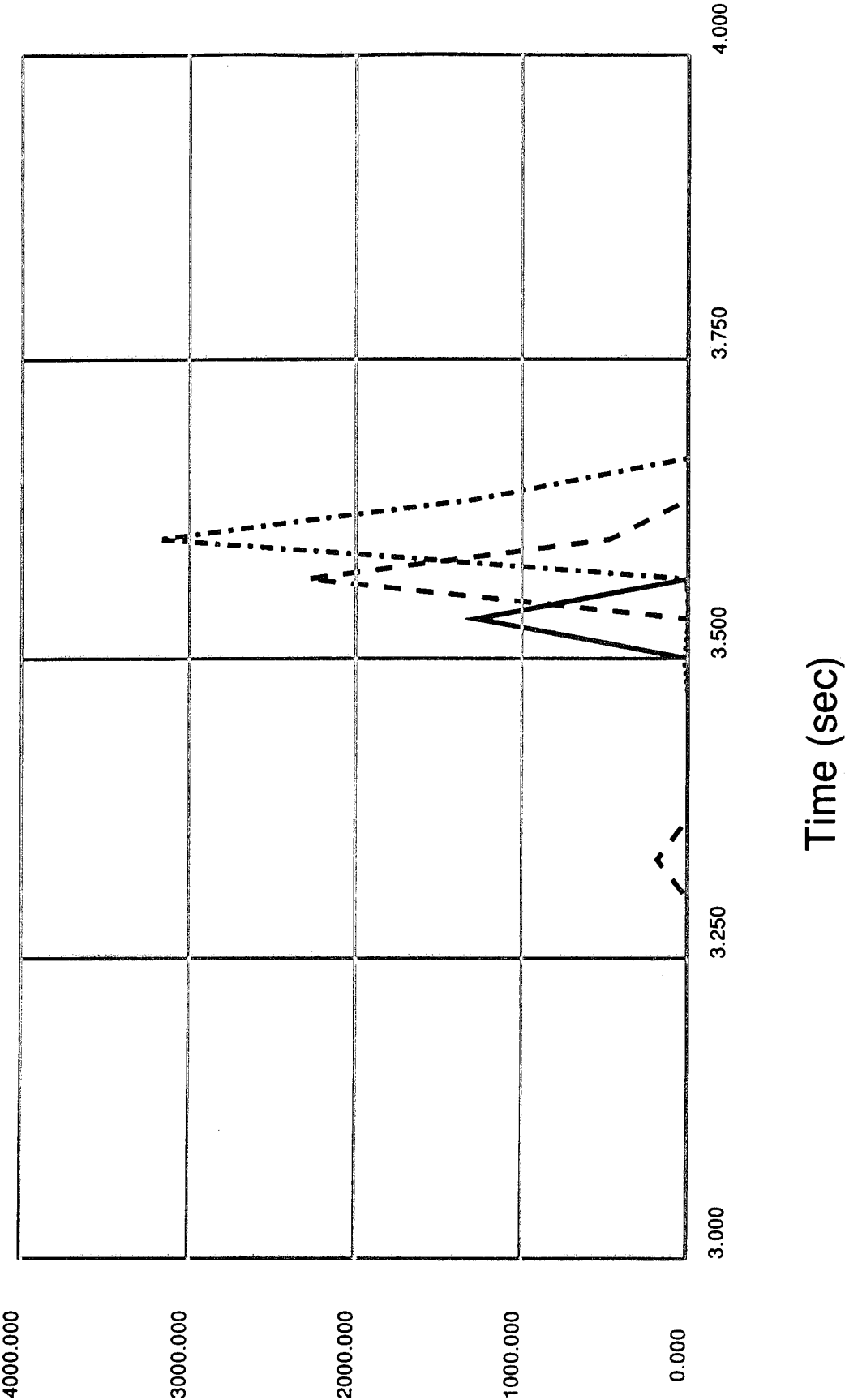
# Port Gunwale Impact Forces



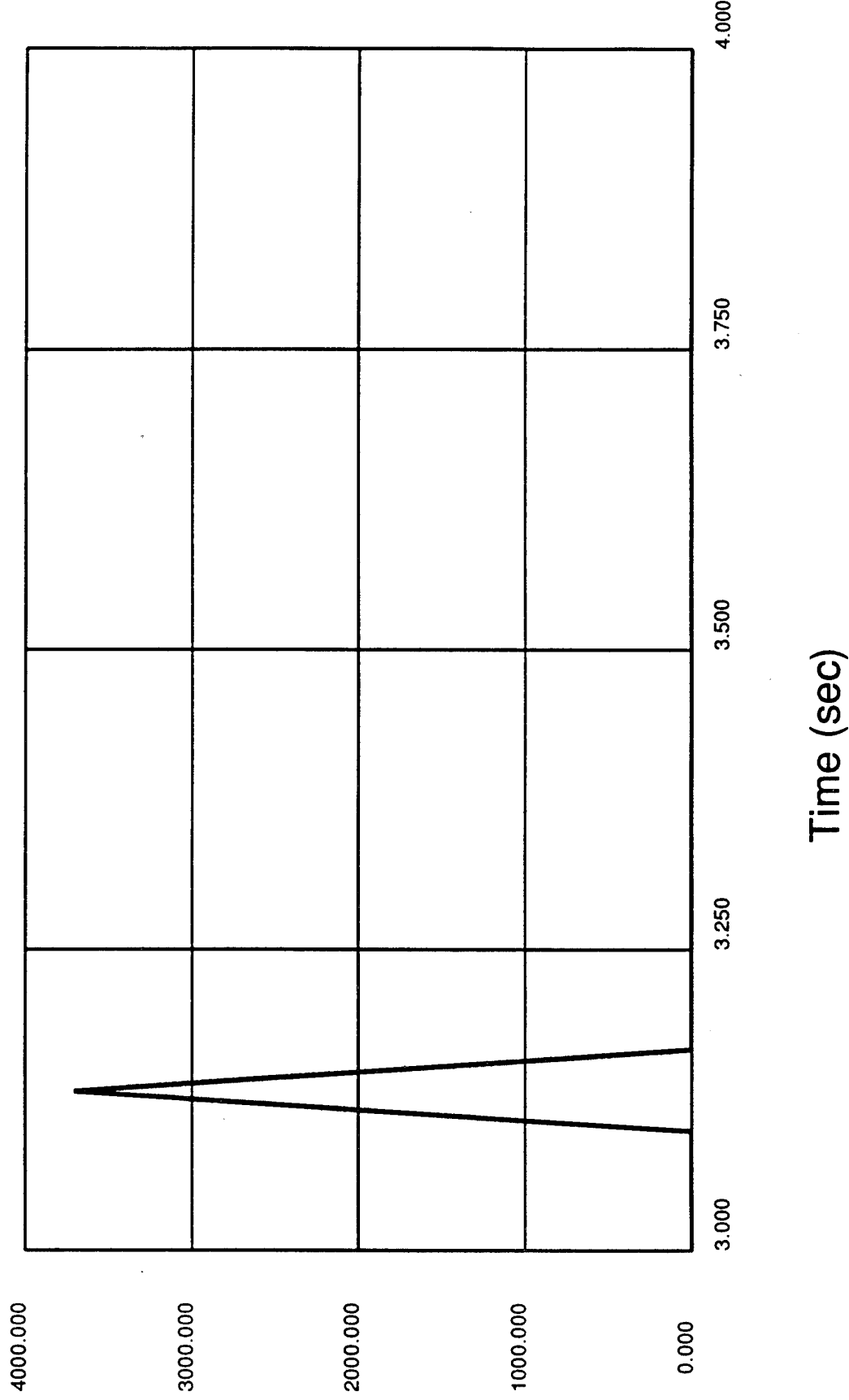
# Starboard Gunwale Impact Forces



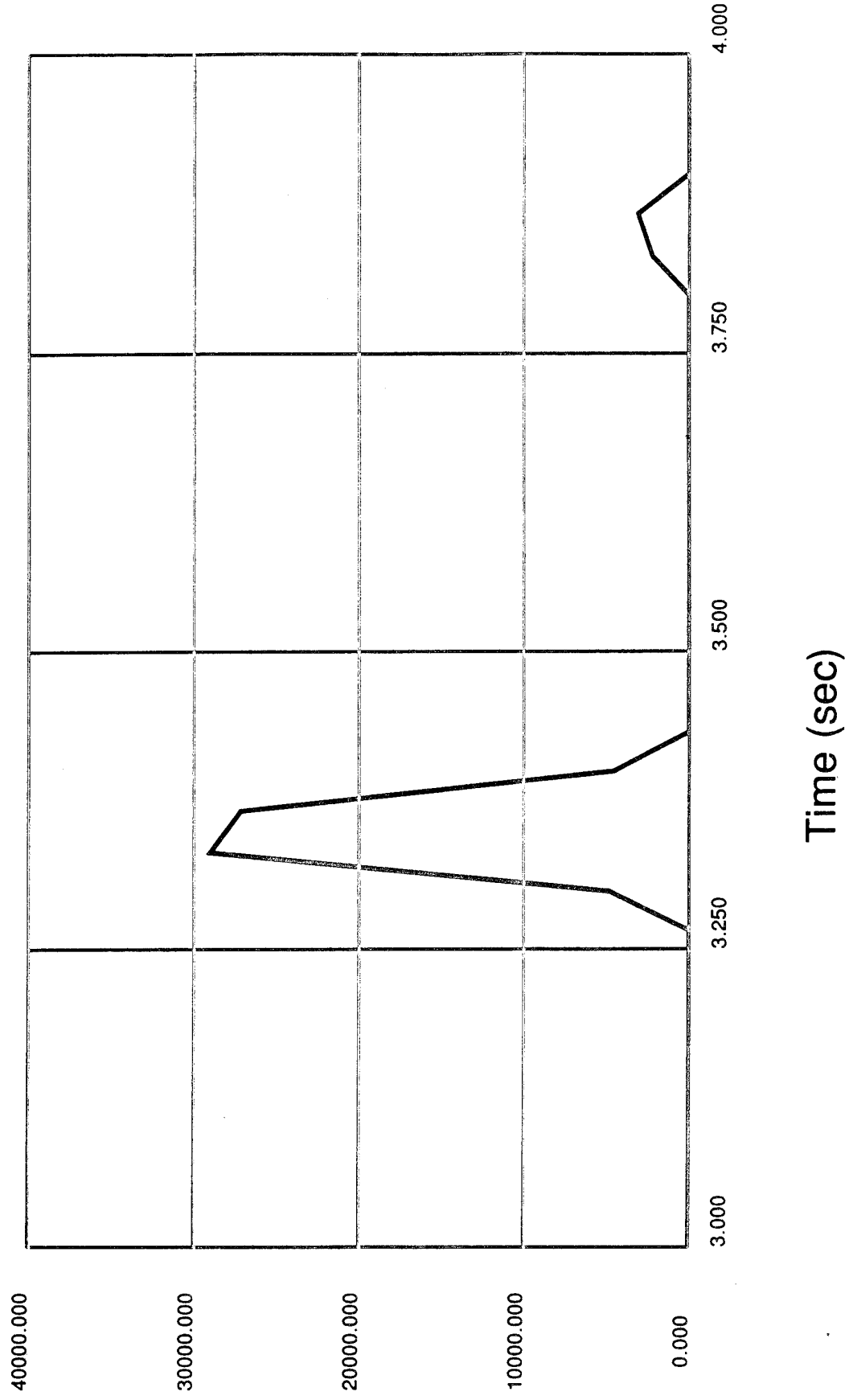
# Port Chine Impact Forces



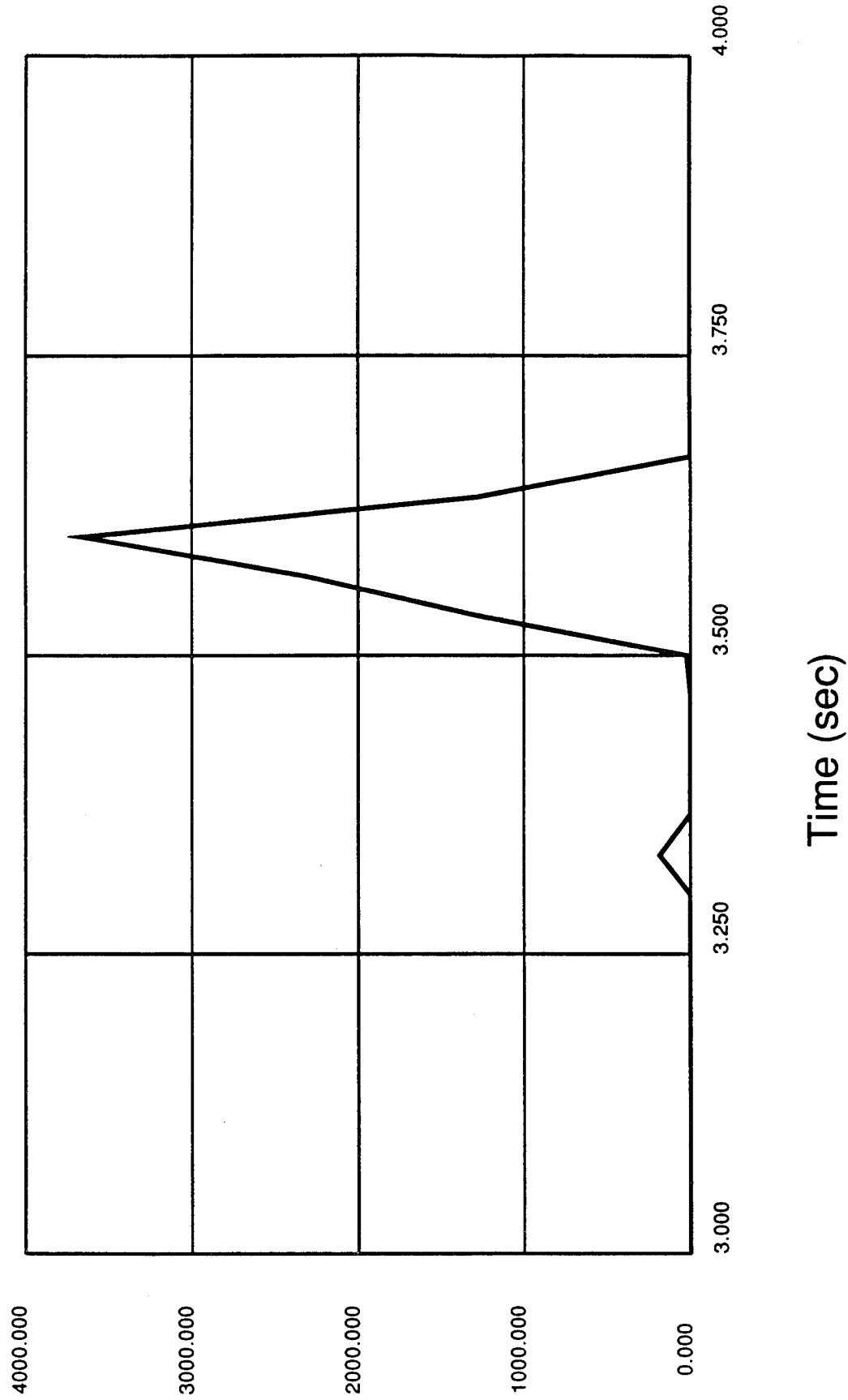
# Total Port Gunwale Impact Force



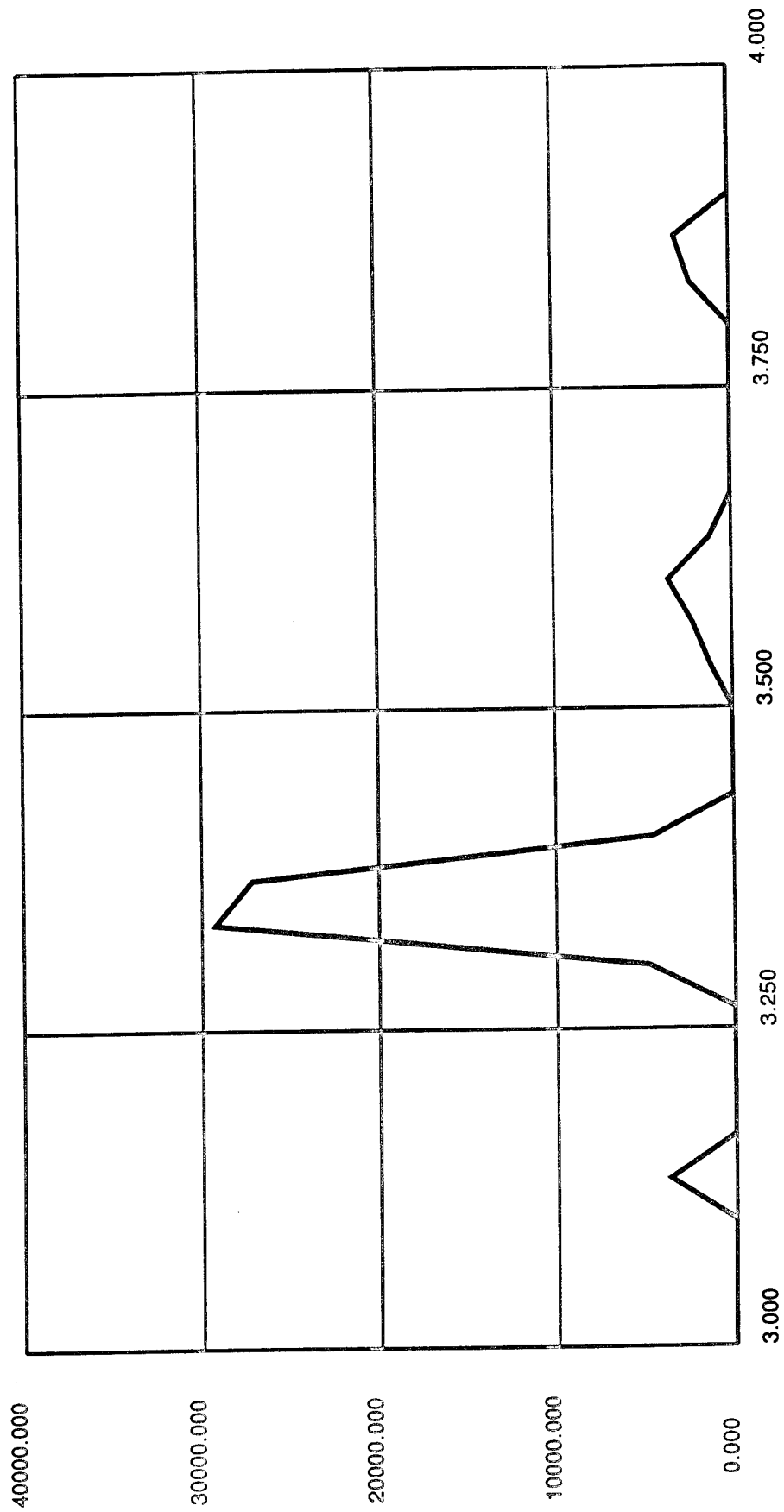
# Total Starboard Gunwale Impact Force



# Total Port Chine Impact Force



# Total Impact Force



Time (sec)

## **APPENDIX E**

### **Output from the 30 MPH Simulation - Tabulated Data**



```
*****
* Mechanical Dynamics, Inc.
*
* A D A M S
*
* Automatic Dynamic Analysis of Mechanical Systems
*
* 12:15:22 31-OCT-91      Version 5.2.1a-hoops
*
*
* Copyright C 1979, 1980, 1981, 1982,
* 1983, 1984, 1985, 1986, 1987, 1988, 1989
* by Mechanical Dynamics, Inc., Ann Arbor, Michigan
*
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* All rights reserved. This code may not be copied or
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* the explicit written permission of the copyright owner.
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* 3055 Plymouth Road
* Ann Arbor, MI 48105-3203
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* >>>> Licensed to: Simulation Dynamics, INC. <<<<
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* >>>> Computer: sgl <<<<
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* >>>> License: LA-0264-880926 <<<<
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Data Set Title:

Boat 30 mph

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## INITIAL CONDITIONS

Maximum displacement error = 0.0000000E+00

Convergence was achieved in 1 iteration(s)

Residual error less than 0.0000000E+00

Rectangular Coordinates  
(Part Center of Mass)

Part	X	Y	Z
100	0.000000000000000E+00	0.000000000000000E+00	0.000000000000000E+00
200	1.328500000000000E+02	0.000000000000000E+00	7.500000000000000E-01
300	-2.000000000000000E+01	0.000000000000000E+00	7.500000000000000E-01

Angular Coordinates (Degrees)  
(Part Center of Mass)

Part	Psi	Theta	Phi
100	0.000000000000000E+00	0.000000000000000E+00	0.000000000000000E+00
200	0.000000000000000E+00	0.000000000000000E+00	0.000000000000000E+00
300	9.000000000000000E+01	0.000000000000000E+00	0.000000000000000E+00

## Velocity Solution

Rectangular Coordinates  
(Part Center of Mass)

Part	Xdot	Ydot	Zdot
100	0.000000000000000E+00	0.000000000000000E+00	0.000000000000000E+00
200	-4.400000000000000E+01	0.000000000000000E+00	0.000000000000000E+00
300	0.000000000000000E+00	0.000000000000000E+00	0.000000000000000E+00

Angular Coordinates (Rad/Time)  
(Part Center of Mass)

Part	Wx	Wy	Wz
100	0.000000000000000E+00	0.000000000000000E+00	0.000000000000000E+00
200	0.000000000000000E+00	1.000000000000000E-03	0.000000000000000E+00
300	0.000000000000000E+00	0.000000000000000E+00	0.000000000000000E+00

1Boat 30 mph

Request Number 2001

## Bullet Boat Displacement

Displacement of Marker 200100 relative to Marker 1002001

Time	Hdg	X	Y	Z	Yaw	Pitch	Roll
0.00000E+00	1.32852E+02	1.32850E+02	0.00000E+00	7.50000E-01	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E-02	1.31385E+02	1.31383E+02	0.00000E+00	7.53265E-01	0.00000E+00	-4.79338E-02	0.00000E+00

6.66667E-02	1.29919E+02	1.29917E+02	0.00000E+00	7.61977E-01	0.00000E+00	-1.55993E-01	0.00000E+00
1.00000E-01	1.28452E+02	1.28450E+02	0.00000E+00	7.74667E-01	0.00000E+00	-2.92789E-01	0.00000E+00
1.33333E-01	1.26988E+02	1.26983E+02	0.00000E+00	7.89925E-01	0.00000E+00	-4.40091E-01	0.00000E+00
1.66667E-01	1.25519E+02	1.25517E+02	0.00000E+00	8.06541E-01	0.00000E+00	-5.88407E-01	0.00000E+00
2.00000E-01	1.24053E+02	1.24050E+02	0.00000E+00	8.23539E-01	0.00000E+00	-7.33209E-01	0.00000E+00
2.33333E-01	1.22586E+02	1.22583E+02	0.00000E+00	8.39905E-01	0.00000E+00	-8.71037E-01	0.00000E+00
2.66667E-01	1.21120E+02	1.21117E+02	0.00000E+00	8.54958E-01	0.00000E+00	-1.00100E+00	0.00000E+00
3.00000E-01	1.19653E+02	1.19650E+02	0.00000E+00	8.68254E-01	0.00000E+00	-1.12335E+00	0.00000E+00
3.33333E-01	1.18187E+02	1.18183E+02	0.00000E+00	8.79484E-01	0.00000E+00	-1.23864E+00	0.00000E+00
3.66667E-01	1.16720E+02	1.16717E+02	0.00000E+00	8.88564E-01	0.00000E+00	-1.34755E+00	0.00000E+00
4.00000E-01	1.15253E+02	1.15250E+02	0.00000E+00	8.95479E-01	0.00000E+00	-1.45068E+00	0.00000E+00
4.33333E-01	1.13787E+02	1.13783E+02	0.00000E+00	9.00299E-01	0.00000E+00	-1.54857E+00	0.00000E+00
4.66667E-01	1.12320E+02	1.12317E+02	0.00000E+00	9.03159E-01	0.00000E+00	-1.64181E+00	0.00000E+00
5.00000E-01	1.10854E+02	1.10850E+02	0.00000E+00	9.04234E-01	0.00000E+00	-1.73090E+00	0.00000E+00
5.33333E-01	1.09387E+02	1.09383E+02	0.00000E+00	9.03724E-01	0.00000E+00	-1.81631E+00	0.00000E+00
5.66667E-01	1.07920E+02	1.07917E+02	0.00000E+00	9.01883E-01	0.00000E+00	-1.89852E+00	0.00000E+00
6.00000E-01	1.06454E+02	1.06450E+02	0.00000E+00	8.98951E-01	0.00000E+00	-1.97793E+00	0.00000E+00
6.33333E-01	1.04987E+02	1.04983E+02	0.00000E+00	8.95162E-01	0.00000E+00	-2.05485E+00	0.00000E+00
6.66667E-01	1.03520E+02	1.03517E+02	0.00000E+00	8.90735E-01	0.00000E+00	-2.12954E+00	0.00000E+00
7.00000E-01	1.02054E+02	1.02050E+02	0.00000E+00	8.85877E-01	0.00000E+00	-2.20222E+00	0.00000E+00
7.33333E-01	1.00587E+02	1.00583E+02	0.00000E+00	8.80764E-01	0.00000E+00	-2.27306E+00	0.00000E+00
7.66667E-01	9.91205E+01	9.91167E+01	0.00000E+00	8.75549E-01	0.00000E+00	-2.34219E+00	0.00000E+00
8.00000E-01	9.76539E+01	9.76500E+01	0.00000E+00	8.70363E-01	0.00000E+00	-2.40972E+00	0.00000E+00
8.33333E-01	9.61872E+01	9.61833E+01	0.00000E+00	8.65309E-01	0.00000E+00	-2.47573E+00	0.00000E+00
8.66667E-01	9.47206E+01	9.47167E+01	0.00000E+00	8.60469E-01	0.00000E+00	-2.54026E+00	0.00000E+00
9.00000E-01	9.32539E+01	9.32500E+01	0.00000E+00	8.55903E-01	0.00000E+00	-2.60337E+00	0.00000E+00
9.33333E-01	9.17873E+01	9.17833E+01	0.00000E+00	8.51651E-01	0.00000E+00	-2.66508E+00	0.00000E+00
9.66667E-01	9.03206E+01	9.03167E+01	0.00000E+00	8.47734E-01	0.00000E+00	-2.72540E+00	0.00000E+00
1.00000E+00	8.88540E+01	8.88500E+01	0.00000E+00	8.44159E-01	0.00000E+00	-2.78434E+00	0.00000E+00
1.03333E+00	8.73874E+01	8.73833E+01	0.00000E+00	8.40770E-01	0.00000E+00	-2.84191E+00	0.00000E+00
1.06667E+00	8.59207E+01	8.59167E+01	0.00000E+00	8.37296E-01	0.00000E+00	-2.89813E+00	0.00000E+00
1.10000E+00	8.44541E+01	8.44500E+01	0.00000E+00	8.33551E-01	0.00000E+00	-2.95304E+00	0.00000E+00
1.13333E+00	8.29875E+01	8.29833E+01	0.00000E+00	8.29548E-01	0.00000E+00	-3.00668E+00	0.00000E+00
1.16667E+00	8.15208E+01	8.15167E+01	0.00000E+00	8.25400E-01	0.00000E+00	-3.05913E+00	0.00000E+00
1.20000E+00	8.00542E+01	8.00500E+01	0.00000E+00	8.21242E-01	0.00000E+00	-3.11044E+00	0.00000E+00
1.23333E+00	7.85876E+01	7.85833E+01	0.00000E+00	8.17119E-01	0.00000E+00	-3.16067E+00	0.00000E+00
1.26667E+00	7.71210E+01	7.71167E+01	0.00000E+00	8.13372E-01	0.00000E+00	-3.20984E+00	0.00000E+00
1.30000E+00	7.56543E+01	7.56500E+01	0.00000E+00	8.09662E-01	0.00000E+00	-3.25799E+00	0.00000E+00
1.33333E+00	7.41877E+01	7.41833E+01	0.00000E+00	8.06747E-01	0.00000E+00	-3.30512E+00	0.00000E+00
1.36667E+00	7.27211E+01	7.27167E+01	0.00000E+00	8.04097E-01	0.00000E+00	-3.35123E+00	0.00000E+00
1.40000E+00	7.12545E+01	7.12500E+01	0.00000E+00	8.01963E-01	0.00000E+00	-3.39630E+00	0.00000E+00
1.43333E+00	6.97879E+01	6.97833E+01	0.00000E+00	8.00377E-01	0.00000E+00	-3.44030E+00	0.00000E+00
1.46667E+00	6.83213E+01	6.83167E+01	0.00000E+00	7.99349E-01	0.00000E+00	-3.48321E+00	0.00000E+00
1.50000E+00	6.68548E+01	6.68500E+01	0.00000E+00	7.98874E-01	0.00000E+00	-3.52501E+00	0.00000E+00
1.53333E+00	6.53882E+01	6.53833E+01	0.00000E+00	7.98926E-01	0.00000E+00	-3.56566E+00	0.00000E+00
1.56667E+00	6.39217E+01	6.39167E+01	0.00000E+00	7.99458E-01	0.00000E+00	-3.60513E+00	0.00000E+00
1.60000E+00	6.24551E+01	6.24500E+01	0.00000E+00	8.00410E-01	0.00000E+00	-3.64341E+00	0.00000E+00
1.63333E+00	6.09886E+01	6.09833E+01	0.00000E+00	8.01706E-01	0.00000E+00	-3.68048E+00	0.00000E+00
1.66667E+00	5.95221E+01	5.95167E+01	0.00000E+00	8.03260E-01	0.00000E+00	-3.71634E+00	0.00000E+00
1.70000E+00	5.80556E+01	5.80500E+01	0.00000E+00	8.04975E-01	0.00000E+00	-3.75099E+00	0.00000E+00
1.73333E+00	5.65891E+01	5.65833E+01	0.00000E+00	8.06754E-01	0.00000E+00	-3.78445E+00	0.00000E+00
1.76667E+00	5.51226E+01	5.51167E+01	0.00000E+00	8.08496E-01	0.00000E+00	-3.81673E+00	0.00000E+00
1.80000E+00	5.36561E+01	5.36500E+01	0.00000E+00	8.10106E-01	0.00000E+00	-3.84789E+00	0.00000E+00
1.83333E+00	5.21896E+01	5.21833E+01	0.00000E+00	8.11149E-01	0.00000E+00	-3.87795E+00	0.00000E+00

1.86667E+00	5.07232E+01	5.07167E+01	0.00000E+00	8.12576E-01	0.00000E+00	-3.90698E+00	0.00000E+00
1.90000E+00	4.92567E+01	4.92500E+01	0.00000E+00	8.13290E-01	0.00000E+00	-3.93504E+00	0.00000E+00
1.93333E+00	4.77930E+01	4.77833E+01	0.00000E+00	8.13582E-01	0.00000E+00	-3.96218E+00	0.00000E+00
1.96667E+00	4.63238E+01	4.63167E+01	0.00000E+00	8.13416E-01	0.00000E+00	-3.98848E+00	0.00000E+00
2.00000E+00	4.48574E+01	4.48500E+01	0.00000E+00	8.12774E-01	0.00000E+00	-4.01400E+00	0.00000E+00
2.03333E+00	4.33909E+01	4.33833E+01	0.00000E+00	8.11654E-01	0.00000E+00	-4.03877E+00	0.00000E+00
2.06667E+00	4.19245E+01	4.19167E+01	0.00000E+00	8.10072E-01	0.00000E+00	-4.06287E+00	0.00000E+00
2.10000E+00	4.04581E+01	4.04500E+01	0.00000E+00	8.08063E-01	0.00000E+00	-4.08636E+00	0.00000E+00
2.13333E+00	3.89917E+01	3.89833E+01	0.00000E+00	8.05679E-01	0.00000E+00	-4.10932E+00	0.00000E+00
2.16667E+00	3.75253E+01	3.75167E+01	0.00000E+00	8.02988E-01	0.00000E+00	-4.13181E+00	0.00000E+00
2.20000E+00	3.60589E+01	3.60500E+01	0.00000E+00	8.00066E-01	0.00000E+00	-4.15389E+00	0.00000E+00
2.23333E+00	3.45925E+01	3.45833E+01	0.00000E+00	7.97002E-01	0.00000E+00	-4.17561E+00	0.00000E+00
2.26667E+00	3.31262E+01	3.31167E+01	0.00000E+00	7.93890E-01	0.00000E+00	-4.19701E+00	0.00000E+00
2.30000E+00	3.16599E+01	3.16500E+01	0.00000E+00	7.90824E-01	0.00000E+00	-4.21812E+00	0.00000E+00
2.33333E+00	3.01936E+01	3.01833E+01	0.00000E+00	7.87898E-01	0.00000E+00	-4.23895E+00	0.00000E+00
2.36667E+00	2.87274E+01	2.87167E+01	0.00000E+00	7.85199E-01	0.00000E+00	-4.25950E+00	0.00000E+00
2.40000E+00	2.72612E+01	2.72500E+01	0.00000E+00	7.82810E-01	0.00000E+00	-4.27977E+00	0.00000E+00
2.43333E+00	2.57952E+01	2.57833E+01	0.00000E+00	7.80799E-01	0.00000E+00	-4.29973E+00	0.00000E+00
2.46667E+00	2.43291E+01	2.43167E+01	0.00000E+00	7.79218E-01	0.00000E+00	-4.31936E+00	0.00000E+00
2.50000E+00	2.28632E+01	2.28500E+01	0.00000E+00	7.78108E-01	0.00000E+00	-4.33863E+00	0.00000E+00
2.53333E+00	2.13975E+01	2.13833E+01	0.00000E+00	7.77487E-01	0.00000E+00	-4.35749E+00	0.00000E+00
2.56667E+00	1.99318E+01	1.99167E+01	0.00000E+00	7.77358E-01	0.00000E+00	-4.37590E+00	0.00000E+00
2.60000E+00	1.84664E+01	1.84500E+01	0.00000E+00	7.77698E-01	0.00000E+00	-4.39381E+00	0.00000E+00
2.63333E+00	1.70012E+01	1.69833E+01	0.00000E+00	7.78485E-01	0.00000E+00	-4.41119E+00	0.00000E+00
2.66667E+00	1.55362E+01	1.55167E+01	0.00000E+00	7.79667E-01	0.00000E+00	-4.42800E+00	0.00000E+00
2.70000E+00	1.40717E+01	1.40500E+01	0.00000E+00	7.81181E-01	0.00000E+00	-4.44420E+00	0.00000E+00
2.73333E+00	1.26077E+01	1.25833E+01	0.00000E+00	7.82950E-01	0.00000E+00	-4.45977E+00	0.00000E+00
2.76667E+00	1.11443E+01	1.11167E+01	0.00000E+00	7.84891E-01	0.00000E+00	-4.47469E+00	0.00000E+00
2.80000E+00	9.68203E+00	9.65000E+00	0.00000E+00	7.86916E-01	0.00000E+00	-4.48895E+00	0.00000E+00
2.83333E+00	8.22127E+00	8.18333E+00	0.00000E+00	7.88934E-01	0.00000E+00	-4.50257E+00	0.00000E+00
2.86667E+00	6.71667E+00	6.71667E+00	0.00000E+00	7.90855E-01	0.00000E+00	-4.51554E+00	0.00000E+00
2.90000E+00	5.30949E+00	5.25000E+00	0.00000E+00	7.92594E-01	0.00000E+00	-4.52789E+00	0.00000E+00
2.93333E+00	3.86577E+00	3.78333E+00	0.00000E+00	7.94070E-01	0.00000E+00	-4.53966E+00	0.00000E+00
2.96667E+00	2.44935E+00	2.31667E+00	0.00000E+00	7.95218E-01	0.00000E+00	-4.55088E+00	0.00000E+00
3.00000E+00	1.16451E+00	8.50000E-01	0.00000E+00	7.95984E-01	0.00000E+00	-4.56161E+00	0.00000E+00
3.03333E+00	1.00718E+00	-6.16667E-01	0.00000E+00	7.96329E-01	0.00000E+00	-4.57188E+00	0.00000E+00
3.06667E+00	2.23031E+00	-2.08333E+00	0.00000E+00	7.96231E-01	0.00000E+00	-4.58178E+00	0.00000E+00
3.10000E+00	3.63808E+00	-3.55000E+00	0.00000E+00	7.95684E-01	0.00000E+00	-4.59134E+00	0.00000E+00
3.13333E+00	5.07855E+00	-5.01592E+00	0.00000E+00	7.95065E-01	0.00000E+00	-4.60852E+00	0.00000E+00
3.16667E+00	6.51472E+00	-6.46506E+00	0.00000E+00	8.02850E-01	0.00000E+00	-4.77788E+00	0.00000E+00
3.20000E+00	7.95270E+00	-7.91135E+00	0.00000E+00	8.09959E-01	0.00000E+00	-4.86097E+00	0.00000E+00
3.23333E+00	9.39510E+00	-9.35989E+00	0.00000E+00	8.12600E-01	0.00000E+00	-4.84616E+00	0.00000E+00
3.26667E+00	1.08362E+01	-1.08056E+01	0.00000E+00	8.13454E-01	0.00000E+00	-4.83327E+00	0.00000E+00
3.30000E+00	1.22737E+01	-1.22467E+01	0.00000E+00	8.13598E-01	0.00000E+00	-4.84055E+00	0.00000E+00
3.33333E+00	1.36653E+01	-1.36393E+01	0.00000E+00	8.42623E-01	0.00000E+00	-5.37012E+00	0.00000E+00
3.36667E+00	1.49525E+01	-1.49200E+01	0.00000E+00	9.85206E-01	0.00000E+00	-7.27837E+00	0.00000E+00
3.40000E+00	1.61818E+01	-1.61333E+01	0.00000E+00	1.25109E+00	0.00000E+00	-9.78089E+00	0.00000E+00
3.43333E+00	1.73978E+01	-1.73292E+01	0.00000E+00	1.54317E+00	0.00000E+00	-1.14361E+01	0.00000E+00
3.46667E+00	1.86094E+01	-1.85208E+01	0.00000E+00	1.81441E+00	0.00000E+00	-1.22519E+01	0.00000E+00
3.50000E+00	1.98158E+01	-1.97087E+01	0.00000E+00	2.05802E+00	0.00000E+00	-1.26246E+01	0.00000E+00
3.53333E+00	2.10160E+01	-2.08928E+01	0.00000E+00	2.27222E+00	0.00000E+00	-1.27760E+01	0.00000E+00
3.56667E+00	2.22087E+01	-2.20718E+01	0.00000E+00	2.46151E+00	0.00000E+00	-1.27851E+01	0.00000E+00
3.60000E+00	2.33933E+01	-2.32447E+01	0.00000E+00	2.63258E+00	0.00000E+00	-1.26854E+01	0.00000E+00
3.63333E+00	2.45712E+01	-2.44123E+01	0.00000E+00	2.78927E+00	0.00000E+00	-1.25072E+01	0.00000E+00
3.66667E+00	2.57439E+01	-2.55776E+01	0.00000E+00	2.92142E+00	0.00000E+00	-1.23501E+01	0.00000E+00

3.70000E+00	2.69096E+01	-2.67398E+01	0.00000E+00	3.01860E+00	0.00000E+00	-1.22678E+01	0.00000E+00
3.73333E+00	2.80678E+01	-2.78984E+01	0.00000E+00	3.07923E+00	0.00000E+00	-1.22306E+01	0.00000E+00
3.76667E+00	2.92187E+01	-2.90534E+01	0.00000E+00	3.10389E+00	0.00000E+00	-1.22122E+01	0.00000E+00
3.80000E+00	3.03627E+01	-3.02048E+01	0.00000E+00	3.09278E+00	0.00000E+00	-1.22026E+01	0.00000E+00
3.83333E+00	3.15002E+01	-3.13525E+01	0.00000E+00	3.04715E+00	0.00000E+00	-1.21882E+01	0.00000E+00
3.86667E+00	3.26335E+01	-3.24973E+01	0.00000E+00	2.97872E+00	0.00000E+00	-1.20921E+01	0.00000E+00
3.90000E+00	3.37694E+01	-3.36453E+01	0.00000E+00	2.89213E+00	0.00000E+00	-1.19369E+01	0.00000E+00
3.93333E+00	3.49065E+01	-3.47959E+01	0.00000E+00	2.77575E+00	0.00000E+00	-1.18305E+01	0.00000E+00
3.96667E+00	3.60424E+01	-3.59468E+01	0.00000E+00	2.62351E+00	0.00000E+00	-1.17790E+01	0.00000E+00
4.00000E+00	3.71774E+01	-3.70975E+01	0.00000E+00	2.43675E+00	0.00000E+00	-1.17479E+01	0.00000E+00
4.03333E+00	3.83133E+01	-3.82481E+01	0.00000E+00	2.23436E+00	0.00000E+00	-1.17260E+01	0.00000E+00
4.06667E+00	3.94514E+01	-3.93987E+01	0.00000E+00	2.03775E+00	0.00000E+00	-1.17003E+01	0.00000E+00
4.10000E+00	4.05916E+01	-4.05494E+01	0.00000E+00	1.85178E+00	0.00000E+00	-1.16646E+01	0.00000E+00
4.13333E+00	4.17337E+01	-4.17000E+01	0.00000E+00	1.67725E+00	0.00000E+00	-1.16160E+01	0.00000E+00
4.16667E+00	4.28774E+01	-4.28506E+01	0.00000E+00	1.51451E+00	0.00000E+00	-1.15532E+01	0.00000E+00
4.20000E+00	4.40224E+01	-4.40012E+01	0.00000E+00	1.36389E+00	0.00000E+00	-1.14767E+01	0.00000E+00
4.23333E+00	4.51685E+01	-4.51518E+01	0.00000E+00	1.22574E+00	0.00000E+00	-1.13876E+01	0.00000E+00
4.26667E+00	4.63155E+01	-4.63025E+01	0.00000E+00	1.10043E+00	0.00000E+00	-1.12878E+01	0.00000E+00
4.30000E+00	4.74634E+01	-4.74531E+01	0.00000E+00	9.88212E-01	0.00000E+00	-1.11796E+01	0.00000E+00
4.33333E+00	4.86118E+01	-4.86037E+01	0.00000E+00	8.89203E-01	0.00000E+00	-1.10653E+01	0.00000E+00
4.36667E+00	4.97608E+01	-4.97543E+01	0.00000E+00	8.03344E-01	0.00000E+00	-1.09473E+01	0.00000E+00
4.40000E+00	5.09102E+01	-5.09049E+01	0.00000E+00	7.30463E-01	0.00000E+00	-1.08272E+01	0.00000E+00
4.43333E+00	5.20599E+01	-5.20556E+01	0.00000E+00	6.70141E-01	0.00000E+00	-1.07071E+01	0.00000E+00
4.46667E+00	5.32098E+01	-5.32062E+01	0.00000E+00	6.21725E-01	0.00000E+00	-1.05886E+01	0.00000E+00
4.50000E+00	5.43599E+01	-5.43568E+01	0.00000E+00	5.84364E-01	0.00000E+00	-1.04725E+01	0.00000E+00
4.53333E+00	5.55102E+01	-5.55074E+01	0.00000E+00	5.57060E-01	0.00000E+00	-1.03592E+01	0.00000E+00
4.56667E+00	5.66606E+01	-5.66580E+01	0.00000E+00	5.38717E-01	0.00000E+00	-1.02488E+01	0.00000E+00
4.60000E+00	5.78111E+01	-5.78087E+01	0.00000E+00	5.28187E-01	0.00000E+00	-1.01413E+01	0.00000E+00
4.63333E+00	5.89616E+01	-5.89593E+01	0.00000E+00	5.24307E-01	0.00000E+00	-1.00366E+01	0.00000E+00
4.66667E+00	6.01122E+01	-6.01099E+01	0.00000E+00	5.25935E-01	0.00000E+00	-9.93443E+00	0.00000E+00
4.70000E+00	6.12628E+01	-6.12605E+01	0.00000E+00	5.31975E-01	0.00000E+00	-9.83448E+00	0.00000E+00
4.73333E+00	6.24135E+01	-6.24111E+01	0.00000E+00	5.41411E-01	0.00000E+00	-9.73648E+00	0.00000E+00
4.76667E+00	6.35642E+01	-6.35618E+01	0.00000E+00	5.53317E-01	0.00000E+00	-9.64022E+00	0.00000E+00
4.80000E+00	6.47149E+01	-6.47124E+01	0.00000E+00	5.66875E-01	0.00000E+00	-9.54549E+00	0.00000E+00
4.83333E+00	6.58656E+01	-6.58630E+01	0.00000E+00	5.81348E-01	0.00000E+00	-9.45216E+00	0.00000E+00
4.86667E+00	6.70163E+01	-6.70136E+01	0.00000E+00	5.96167E-01	0.00000E+00	-9.36013E+00	0.00000E+00
4.90000E+00	6.81670E+01	-6.81642E+01	0.00000E+00	6.10846E-01	0.00000E+00	-9.26932E+00	0.00000E+00
4.93333E+00	6.93177E+01	-6.93148E+01	0.00000E+00	6.24997E-01	0.00000E+00	-9.17968E+00	0.00000E+00
4.96667E+00	7.04684E+01	-7.04655E+01	0.00000E+00	6.38326E-01	0.00000E+00	-9.09120E+00	0.00000E+00
5.00000E+00	7.16190E+01	-7.16161E+01	0.00000E+00	6.50621E-01	0.00000E+00	-9.00387E+00	0.00000E+00
5.03333E+00	7.27697E+01	-7.27667E+01	0.00000E+00	6.61748E-01	0.00000E+00	-8.91769E+00	0.00000E+00
5.06667E+00	7.39204E+01	-7.39173E+01	0.00000E+00	6.71634E-01	0.00000E+00	-8.83269E+00	0.00000E+00
5.10000E+00	7.50710E+01	-7.50679E+01	0.00000E+00	6.80259E-01	0.00000E+00	-8.74889E+00	0.00000E+00
5.13333E+00	7.62217E+01	-7.62186E+01	0.00000E+00	6.87645E-01	0.00000E+00	-8.66631E+00	0.00000E+00
5.16667E+00	7.73723E+01	-7.73692E+01	0.00000E+00	6.93848E-01	0.00000E+00	-8.58500E+00	0.00000E+00
5.20000E+00	7.85229E+01	-7.85198E+01	0.00000E+00	6.98950E-01	0.00000E+00	-8.50497E+00	0.00000E+00
5.23333E+00	7.96735E+01	-7.96704E+01	0.00000E+00	7.03049E-01	0.00000E+00	-8.42626E+00	0.00000E+00
5.26667E+00	8.08241E+01	-8.08210E+01	0.00000E+00	7.06257E-01	0.00000E+00	-8.34891E+00	0.00000E+00
5.30000E+00	8.19747E+01	-8.19717E+01	0.00000E+00	7.08689E-01	0.00000E+00	-8.27292E+00	0.00000E+00
5.33333E+00	8.31253E+01	-8.31223E+01	0.00000E+00	7.10463E-01	0.00000E+00	-8.19834E+00	0.00000E+00
5.36667E+00	8.42759E+01	-8.42729E+01	0.00000E+00	7.11692E-01	0.00000E+00	-8.12517E+00	0.00000E+00
5.40000E+00	8.54265E+01	-8.54235E+01	0.00000E+00	7.12486E-01	0.00000E+00	-8.05344E+00	0.00000E+00
5.43333E+00	8.65771E+01	-8.65741E+01	0.00000E+00	7.12945E-01	0.00000E+00	-7.98315E+00	0.00000E+00
5.46667E+00	8.77277E+01	-8.77248E+01	0.00000E+00	7.13159E-01	0.00000E+00	-7.91432E+00	0.00000E+00

## boat30.out

Thu Oct 31 12:22:24 1991

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5.50000E+00	8.88782E+01	-8.88754E+01	0.00000E+00	7.13210E-01	0.00000E+00	-7.84694E+00	0.00000E+00
5.53333E+00	9.00288E+01	-9.00260E+01	0.00000E+00	7.13168E-01	0.00000E+00	-7.78102E+00	0.00000E+00
5.56667E+00	9.11794E+01	-9.11766E+01	0.00000E+00	7.13092E-01	0.00000E+00	-7.71655E+00	0.00000E+00
5.60000E+00	9.23300E+01	-9.23272E+01	0.00000E+00	7.13030E-01	0.00000E+00	-7.65351E+00	0.00000E+00
5.63333E+00	9.34806E+01	-9.34779E+01	0.00000E+00	7.13021E-01	0.00000E+00	-7.59190E+00	0.00000E+00
5.66667E+00	9.46312E+01	-9.46285E+01	0.00000E+00	7.13093E-01	0.00000E+00	-7.53170E+00	0.00000E+00
5.70000E+00	9.57818E+01	-9.57791E+01	0.00000E+00	7.13265E-01	0.00000E+00	-7.47287E+00	0.00000E+00
5.73333E+00	9.69323E+01	-9.69297E+01	0.00000E+00	7.13551E-01	0.00000E+00	-7.41541E+00	0.00000E+00
5.76667E+00	9.80829E+01	-9.80803E+01	0.00000E+00	7.13957E-01	0.00000E+00	-7.35929E+00	0.00000E+00
5.80000E+00	9.92335E+01	-9.92310E+01	0.00000E+00	7.14484E-01	0.00000E+00	-7.30446E+00	0.00000E+00
5.83333E+00	1.00384E+02	-1.00382E+02	0.00000E+00	7.15128E-01	0.00000E+00	-7.25092E+00	0.00000E+00
5.86667E+00	1.01535E+02	-1.01532E+02	0.00000E+00	7.15882E-01	0.00000E+00	-7.19863E+00	0.00000E+00
5.90000E+00	1.02685E+02	-1.02683E+02	0.00000E+00	7.16736E-01	0.00000E+00	-7.14755E+00	0.00000E+00
5.93333E+00	1.03836E+02	-1.03833E+02	0.00000E+00	7.17678E-01	0.00000E+00	-7.09767E+00	0.00000E+00
5.96667E+00	1.04987E+02	-1.04984E+02	0.00000E+00	7.18697E-01	0.00000E+00	-7.04894E+00	0.00000E+00
6.00000E+00	1.06137E+02	-1.06135E+02	0.00000E+00	7.19778E-01	0.00000E+00	-7.00135E+00	0.00000E+00

1Boat 30 mph  
Request Number 2002

## Bullet Boat Velocity

Velocity of Marker 200100 relative to Marker 1002001

Time	Vm	Vx	Vy	Vz	Wm	Wx	Wy	Wz
0.00000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	0.00000E+00	1.00000E-03	0.00000E+00	1.00000E-03	0.00000E+00
3.33333E-02	4.40004E+01	-4.40000E+01	0.00000E+00	1.89817E-01	4.58689E-02	0.00000E+00	4.58689E-02	0.00000E+00
6.66667E-02	4.40013E+01	-4.40000E+01	0.00000E+00	3.32138E-01	6.74603E-02	0.00000E+00	6.74603E-02	0.00000E+00
1.00000E-01	4.40021E+01	-4.40000E+01	0.00000E+00	4.29423E-01	7.62262E-02	0.00000E+00	7.62262E-02	0.00000E+00
1.33333E-01	4.40027E+01	-4.40000E+01	0.00000E+00	4.86399E-01	7.83047E-02	0.00000E+00	7.83047E-02	0.00000E+00
1.66667E-01	4.40029E+01	-4.40000E+01	0.00000E+00	5.08359E-01	7.68827E-02	0.00000E+00	7.68827E-02	0.00000E+00
2.00000E-01	4.40029E+01	-4.40000E+01	0.00000E+00	5.00985E-01	7.35722E-02	0.00000E+00	7.35722E-02	0.00000E+00
2.33333E-01	4.40025E+01	-4.40000E+01	0.00000E+00	4.71167E-01	6.97084E-02	0.00000E+00	6.97084E-02	0.00000E+00
2.66667E-01	4.40021E+01	-4.40000E+01	0.00000E+00	4.25053E-01	6.58311E-02	0.00000E+00	6.58311E-02	0.00000E+00
3.00000E-01	4.40015E+01	-4.40000E+01	0.00000E+00	3.68057E-01	6.21177E-02	0.00000E+00	6.21177E-02	0.00000E+00
3.33333E-01	4.40011E+01	-4.40000E+01	0.00000E+00	3.05033E-01	5.86516E-02	0.00000E+00	5.86516E-02	0.00000E+00
3.66667E-01	4.40007E+01	-4.40000E+01	0.00000E+00	2.39694E-01	5.54500E-02	0.00000E+00	5.54500E-02	0.00000E+00
4.00000E-01	4.40003E+01	-4.40000E+01	0.00000E+00	1.75284E-01	5.25534E-02	0.00000E+00	5.25534E-02	0.00000E+00
4.33333E-01	4.40001E+01	-4.40000E+01	0.00000E+00	1.14031E-01	4.99647E-02	0.00000E+00	4.99647E-02	0.00000E+00
4.66667E-01	4.40000E+01	-4.40000E+01	0.00000E+00	5.76596E-02	4.6701E-02	0.00000E+00	4.6701E-02	0.00000E+00
5.00000E-01	4.40000E+01	-4.40000E+01	0.00000E+00	7.34550E-03	4.56470E-02	0.00000E+00	4.56470E-02	0.00000E+00
5.33333E-01	4.40000E+01	-4.40000E+01	0.00000E+00	-3.62546E-02	4.38681E-02	0.00000E+00	4.38681E-02	0.00000E+00
5.66667E-01	4.40001E+01	-4.40000E+01	0.00000E+00	-7.26660E-02	4.23004E-02	0.00000E+00	4.23004E-02	0.00000E+00
6.00000E-01	4.40001E+01	-4.40000E+01	0.00000E+00	-1.01882E-01	4.09131E-02	0.00000E+00	4.09131E-02	0.00000E+00
6.33333E-01	4.40002E+01	-4.40000E+01	0.00000E+00	-1.24215E-01	3.96780E-02	0.00000E+00	3.96780E-02	0.00000E+00
6.66667E-01	4.40002E+01	-4.40000E+01	0.00000E+00	-1.40180E-01	3.85687E-02	0.00000E+00	3.85687E-02	0.00000E+00
7.00000E-01	4.40003E+01	-4.40000E+01	0.00000E+00	-1.50392E-01	3.75608E-02	0.00000E+00	3.75608E-02	0.00000E+00
7.33333E-01	4.40003E+01	-4.40000E+01	0.00000E+00	-1.55610E-01	3.66339E-02	0.00000E+00	3.66339E-02	0.00000E+00
7.66667E-01	4.40003E+01	-4.40000E+01	0.00000E+00	-1.56578E-01	3.57699E-02	0.00000E+00	3.57699E-02	0.00000E+00
8.00000E-01	4.40003E+01	-4.40000E+01	0.00000E+00	-1.54046E-01	3.49534E-02	0.00000E+00	3.49534E-02	0.00000E+00
8.33333E-01	4.40003E+01	-4.40000E+01	0.00000E+00	-1.48740E-01	3.41716E-02	0.00000E+00	3.41716E-02	0.00000E+00
8.66667E-01	4.40002E+01	-4.40000E+01	0.00000E+00	-1.41340E-01	3.34145E-02	0.00000E+00	3.34145E-02	0.00000E+00
9.00000E-01	4.40002E+01	-4.40000E+01	0.00000E+00	-1.32469E-01	3.26739E-02	0.00000E+00	3.26739E-02	0.00000E+00
9.33333E-01	4.40002E+01	-4.40000E+01	0.00000E+00	-1.22676E-01	3.19440E-02	0.00000E+00	3.19440E-02	0.00000E+00
9.66667E-01	4.40001E+01	-4.40000E+01	0.00000E+00	-1.12431E-01	3.12209E-02	0.00000E+00	3.12209E-02	0.00000E+00
1.00000E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-1.02126E-01	3.05019E-02	0.00000E+00	3.05019E-02	0.00000E+00

1.03333E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-1.01636E-01	2.97883E-02	0.00000E+00	2.97883E-02	0.00000E+00
1.06667E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-1.09113E-01	2.90876E-02	0.00000E+00	2.90876E-02	0.00000E+00
1.10000E+00	4.40002E+01	-4.40000E+01	0.00000E+00	-1.17598E-01	2.84114E-02	0.00000E+00	2.84114E-02	0.00000E+00
1.13333E+00	4.40002E+01	-4.40000E+01	0.00000E+00	-1.23462E-01	2.77681E-02	0.00000E+00	2.77681E-02	0.00000E+00
1.16667E+00	4.40002E+01	-4.40000E+01	0.00000E+00	-1.25398E-01	2.71592E-02	0.00000E+00	2.71592E-02	0.00000E+00
1.20000E+00	4.40002E+01	-4.40000E+01	0.00000E+00	-1.23576E-01	2.65803E-02	0.00000E+00	2.65803E-02	0.00000E+00
1.23333E+00	4.40002E+01	-4.40000E+01	0.00000E+00	-1.18435E-01	2.60238E-02	0.00000E+00	2.60238E-02	0.00000E+00
1.26667E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-1.10344E-01	2.54817E-02	0.00000E+00	2.54817E-02	0.00000E+00
1.30000E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-9.96394E-02	2.49463E-02	0.00000E+00	2.49463E-02	0.00000E+00
1.33333E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-8.66968E-02	2.44111E-02	0.00000E+00	2.44111E-02	0.00000E+00
1.36667E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-7.19571E-02	2.38705E-02	0.00000E+00	2.38705E-02	0.00000E+00
1.40000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-5.59432E-02	2.32000E-02	0.00000E+00	2.32000E-02	0.00000E+00
1.43333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-3.92378E-02	2.27567E-02	0.00000E+00	2.27567E-02	0.00000E+00
1.46667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-2.24515E-02	2.21787E-02	0.00000E+00	2.21787E-02	0.00000E+00
1.50000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-6.17137E-03	2.15855E-02	0.00000E+00	2.15855E-02	0.00000E+00
1.53333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	9.02831E-03	2.09777E-02	0.00000E+00	2.09777E-02	0.00000E+00
1.56667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	2.26178E-02	2.03574E-02	0.00000E+00	2.03574E-02	0.00000E+00
1.60000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	3.41325E-02	1.97278E-02	0.00000E+00	1.97278E-02	0.00000E+00
1.63333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	4.31909E-02	1.90932E-02	0.00000E+00	1.90932E-02	0.00000E+00
1.66667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	4.95067E-02	1.84583E-02	0.00000E+00	1.84583E-02	0.00000E+00
1.70000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	5.28976E-02	1.78285E-02	0.00000E+00	1.78285E-02	0.00000E+00
1.73333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	5.32903E-02	1.72090E-02	0.00000E+00	1.72090E-02	0.00000E+00
1.76667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	5.07238E-02	1.66055E-02	0.00000E+00	1.66055E-02	0.00000E+00
1.80000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	4.53463E-02	1.60230E-02	0.00000E+00	1.60230E-02	0.00000E+00
1.83333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	3.74082E-02	1.54661E-02	0.00000E+00	1.54661E-02	0.00000E+00
1.86667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	2.72515E-02	1.49391E-02	0.00000E+00	1.49391E-02	0.00000E+00
1.90000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	1.52976E-02	1.44452E-02	0.00000E+00	1.44452E-02	0.00000E+00
1.93333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	2.02965E-03	1.39868E-02	0.00000E+00	1.39868E-02	0.00000E+00
1.96667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-1.20551E-02	1.35608E-02	0.00000E+00	1.35608E-02	0.00000E+00
2.00000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-2.64602E-02	1.31606E-02	0.00000E+00	1.31606E-02	0.00000E+00
2.03333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	4.06561E-02	1.27880E-02	0.00000E+00	1.27880E-02	0.00000E+00
2.06667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-5.40813E-02	1.24508E-02	0.00000E+00	1.24508E-02	0.00000E+00
2.10000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-6.61853E-02	1.21539E-02	0.00000E+00	1.21539E-02	0.00000E+00
2.13333E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-7.65008E-02	1.18928E-02	0.00000E+00	1.18928E-02	0.00000E+00
2.16667E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-8.46231E-02	1.16643E-02	0.00000E+00	1.16643E-02	0.00000E+00
2.20000E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-9.02330E-02	1.14644E-02	0.00000E+00	1.14644E-02	0.00000E+00
2.23333E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-9.31098E-02	1.12874E-02	0.00000E+00	1.12874E-02	0.00000E+00
2.26667E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-9.31388E-02	1.11275E-02	0.00000E+00	1.11275E-02	0.00000E+00
2.30000E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-9.03245E-02	1.09785E-02	0.00000E+00	1.09785E-02	0.00000E+00
2.33333E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-8.47692E-02	1.08340E-02	0.00000E+00	1.08340E-02	0.00000E+00
2.36667E+00	4.40001E+01	-4.40000E+01	0.00000E+00	-7.66734E-02	1.06881E-02	0.00000E+00	1.06881E-02	0.00000E+00
2.40000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-6.63131E-02	1.05349E-02	0.00000E+00	1.05349E-02	0.00000E+00
2.43333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-5.41025E-02	1.03693E-02	0.00000E+00	1.03693E-02	0.00000E+00
2.46667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-4.05003E-02	1.01872E-02	0.00000E+00	1.01872E-02	0.00000E+00
2.50000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-2.60136E-02	9.98521E-03	0.00000E+00	9.98521E-03	0.00000E+00
2.53333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-1.11814E-02	9.76123E-03	0.00000E+00	9.76123E-03	0.00000E+00
2.56667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	3.43580E-03	9.51428E-03	0.00000E+00	9.51428E-03	0.00000E+00
2.60000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	1.72132E-02	9.24496E-03	0.00000E+00	9.24496E-03	0.00000E+00
2.63333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	2.98479E-02	8.95419E-03	0.00000E+00	8.95419E-03	0.00000E+00
2.66667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	4.07907E-02	8.64454E-03	0.00000E+00	8.64454E-03	0.00000E+00
2.70000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	4.96476E-02	8.31945E-03	0.00000E+00	8.31945E-03	0.00000E+00
2.73333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	5.61126E-02	7.98313E-03	0.00000E+00	7.98313E-03	0.00000E+00
2.76667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	5.99764E-02	7.64049E-03	0.00000E+00	7.64049E-03	0.00000E+00
2.80000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	6.11200E-02	7.29669E-03	0.00000E+00	7.29669E-03	0.00000E+00

2.83333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	5.95267E-02	6.95701E-03	0.00000E+00	6.95701E-03	0.00000E+00
2.86667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	5.52837E-02	6.62673E-03	0.00000E+00	6.62673E-03	0.00000E+00
2.90000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	4.85778E-02	6.31088E-03	0.00000E+00	6.31088E-03	0.00000E+00
2.93333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	3.96665E-02	6.01425E-03	0.00000E+00	6.01425E-03	0.00000E+00
2.96667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	2.89345E-02	5.74079E-03	0.00000E+00	5.74079E-03	0.00000E+00
3.00000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	1.68077E-02	5.49376E-03	0.00000E+00	5.49376E-03	0.00000E+00
3.03333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	3.75884E+00	5.27563E-03	0.00000E+00	5.27563E-03	0.00000E+00
3.06667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-9.70760E-03	5.08797E-03	0.00000E+00	5.08797E-03	0.00000E+00
3.10000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-2.30640E-02	4.93135E-03	0.00000E+00	4.93135E-03	0.00000E+00
3.13333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	2.95697E-02	4.80720E-02	0.00000E+00	8.07201E-02	0.00000E+00
3.16667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	2.76360E-01	8.07201E-02	0.00000E+00	8.07201E-02	0.00000E+00
3.20000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	1.08985E-01	4.29462E-03	0.00000E+00	-4.29462E-03	0.00000E+00
3.23333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	4.59442E-02	8.96027E-03	0.00000E+00	-8.96027E-03	0.00000E+00
3.26667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	7.59230E-03	3.51124E-03	0.00000E+00	-3.51124E-03	0.00000E+00
3.30000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	6.46334E-02	3.45139E-02	0.00000E+00	3.45139E-02	0.00000E+00
3.33333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	2.08990E+00	6.02800E-01	0.00000E+00	6.02800E-01	0.00000E+00
3.36667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	6.51598E+00	1.32776E+00	0.00000E+00	1.32776E+00	0.00000E+00
3.40000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	8.92186E+00	1.16983E+00	0.00000E+00	1.16983E+00	0.00000E+00
3.43333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	8.51891E+00	5.97700E-01	0.00000E+00	5.97700E-01	0.00000E+00
3.46667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	7.74631E+00	2.77083E-01	0.00000E+00	2.77083E-01	0.00000E+00
3.50000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	6.86356E+00	1.22097E-01	0.00000E+00	1.22097E-01	0.00000E+00
3.53333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	6.00700E+00	4.32807E-02	0.00000E+00	4.32807E-02	0.00000E+00
3.56667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	5.34136E+00	1.21823E-02	0.00000E+00	-1.21823E-02	0.00000E+00
3.60000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	4.92560E+00	7.46954E-02	0.00000E+00	-7.46954E-02	0.00000E+00
3.63333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	4.43157E+00	1.00681E-01	0.00000E+00	-1.00681E-01	0.00000E+00
3.66667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	3.45088E+00	5.90913E-02	0.00000E+00	-5.90913E-02	0.00000E+00
3.70000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	2.35874E+00	2.75193E-02	0.00000E+00	-2.75193E-02	0.00000E+00
3.73333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	1.27788E+00	1.36056E-02	0.00000E+00	-1.36056E-02	0.00000E+00
3.76667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	2.03160E-01	7.01643E-03	0.00000E+00	-7.01643E-03	0.00000E+00
3.80000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-6.69310E-01	3.58005E-03	0.00000E+00	-3.58005E-03	0.00000E+00
3.83333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-1.80884E-02	1.99884E-02	0.00000E+00	-1.99884E-02	0.00000E+00
3.86667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-2.25713E+00	8.09041E-02	0.00000E+00	-8.09041E-02	0.00000E+00
3.90000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-2.98757E+00	7.27424E-02	0.00000E+00	-7.27424E-02	0.00000E+00
3.93333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-4.03782E+00	3.62422E-02	0.00000E+00	-3.62422E-02	0.00000E+00
3.96667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-5.09592E+00	1.82368E-02	0.00000E+00	-1.82368E-02	0.00000E+00
4.00000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-6.12397E+00	1.10175E-02	0.00000E+00	-1.10175E-02	0.00000E+00
4.03333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-6.07237E+00	1.13208E-02	0.00000E+00	-1.13208E-02	0.00000E+00
4.06667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-5.75328E+00	1.54596E-02	0.00000E+00	-1.54596E-02	0.00000E+00
4.10000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-5.41022E+00	2.17522E-02	0.00000E+00	-2.17522E-02	0.00000E+00
4.13333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-5.06217E+00	2.91107E-02	0.00000E+00	-2.91107E-02	0.00000E+00
4.16667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-4.70532E+00	3.65810E-02	0.00000E+00	-3.65810E-02	0.00000E+00
4.20000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-4.33701E+00	4.36759E-02	0.00000E+00	-4.36759E-02	0.00000E+00
4.23333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-3.95696E+00	4.99284E-02	0.00000E+00	-4.99284E-02	0.00000E+00
4.26667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-3.56691E+00	5.50457E-02	0.00000E+00	-5.50457E-02	0.00000E+00
4.30000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-3.17027E+00	5.88907E-02	0.00000E+00	-5.88907E-02	0.00000E+00
4.33333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-2.77211E+00	6.14184E-02	0.00000E+00	-6.14184E-02	0.00000E+00
4.36667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-2.37849E+00	6.27366E-02	0.00000E+00	-6.27366E-02	0.00000E+00
4.40000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-1.99387E+00	6.29789E-02	0.00000E+00	-6.29789E-02	0.00000E+00
4.43333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-1.62555E+00	6.24121E-02	0.00000E+00	-6.24121E-02	0.00000E+00
4.46667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-1.28042E+00	6.13557E-02	0.00000E+00	-6.13557E-02	0.00000E+00
4.50000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-9.63502E-01	6.00192E-02	0.00000E+00	-6.00192E-02	0.00000E+00
4.53333E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-6.78269E-01	5.85356E-02	0.00000E+00	-5.85356E-02	0.00000E+00
4.56667E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-4.26845E-01	5.70043E-02	0.00000E+00	-5.70043E-02	0.00000E+00
4.60000E+00	4.40000E+01	-4.40000E+01	0.00000E+00	-2.10169E-01	5.55054E-02	0.00000E+00	-5.55054E-02	0.00000E+00



## boat30.out

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4.63333E+00	3.45186E+01	-3.45186E+01	0.00000E+00	-2.82419E-02	5.41215E-02	0.00000E+00	-5.41215E-02	0.00000E+00	0.00000E+00
4.66667E+00	3.45188E+01	-3.45186E+01	0.00000E+00	1.19987E-01	5.28885E-02	0.00000E+00	-5.28885E-02	0.00000E+00	0.00000E+00
4.70000E+00	3.45194E+01	-3.45186E+01	0.00000E+00	2.36469E-01	5.18028E-02	0.00000E+00	-5.18028E-02	0.00000E+00	0.00000E+00
4.73333E+00	3.45201E+01	-3.45186E+01	0.00000E+00	3.23803E-01	5.08446E-02	0.00000E+00	-5.08446E-02	0.00000E+00	0.00000E+00
4.76667E+00	3.45207E+01	-3.45186E+01	0.00000E+00	3.85002E-01	4.99919E-02	0.00000E+00	-4.99919E-02	0.00000E+00	0.00000E+00
4.80000E+00	3.45212E+01	-3.45186E+01	0.00000E+00	4.23313E-01	4.92237E-02	0.00000E+00	-4.92237E-02	0.00000E+00	0.00000E+00
4.83333E+00	3.45214E+01	-3.45186E+01	0.00000E+00	4.42070E-01	4.85202E-02	0.00000E+00	-4.85202E-02	0.00000E+00	0.00000E+00
4.86667E+00	3.45214E+01	-3.45186E+01	0.00000E+00	4.44611E-01	4.78637E-02	0.00000E+00	-4.78637E-02	0.00000E+00	0.00000E+00
4.90000E+00	3.45213E+01	-3.45186E+01	0.00000E+00	4.34068E-01	4.72382E-02	0.00000E+00	-4.72382E-02	0.00000E+00	0.00000E+00
4.93333E+00	3.45211E+01	-3.45186E+01	0.00000E+00	4.13364E-01	4.66303E-02	0.00000E+00	-4.66303E-02	0.00000E+00	0.00000E+00
4.96667E+00	3.45207E+01	-3.45186E+01	0.00000E+00	3.85162E-01	4.60291E-02	0.00000E+00	-4.60291E-02	0.00000E+00	0.00000E+00
5.00000E+00	3.45204E+01	-3.45186E+01	0.00000E+00	3.51829E-01	4.54265E-02	0.00000E+00	-4.54265E-02	0.00000E+00	0.00000E+00
5.03333E+00	3.45200E+01	-3.45186E+01	0.00000E+00	3.15416E-01	4.48165E-02	0.00000E+00	-4.48165E-02	0.00000E+00	0.00000E+00
5.06667E+00	3.45197E+01	-3.45186E+01	0.00000E+00	2.77652E-01	4.41951E-02	0.00000E+00	-4.41951E-02	0.00000E+00	0.00000E+00
5.10000E+00	3.45194E+01	-3.45186E+01	0.00000E+00	2.39967E-01	4.35597E-02	0.00000E+00	-4.35597E-02	0.00000E+00	0.00000E+00
5.13333E+00	3.45192E+01	-3.45186E+01	0.00000E+00	2.03505E-01	4.29088E-02	0.00000E+00	-4.29088E-02	0.00000E+00	0.00000E+00
5.16667E+00	3.45190E+01	-3.45186E+01	0.00000E+00	1.69145E-01	4.22418E-02	0.00000E+00	-4.22418E-02	0.00000E+00	0.00000E+00
5.20000E+00	3.45189E+01	-3.45186E+01	0.00000E+00	1.37527E-01	4.15587E-02	0.00000E+00	-4.15587E-02	0.00000E+00	0.00000E+00
5.23333E+00	3.45188E+01	-3.45186E+01	0.00000E+00	1.09080E-01	4.08601E-02	0.00000E+00	-4.08601E-02	0.00000E+00	0.00000E+00
5.26667E+00	3.45187E+01	-3.45186E+01	0.00000E+00	8.40521E-02	4.01470E-02	0.00000E+00	-4.01470E-02	0.00000E+00	0.00000E+00
5.30000E+00	3.45186E+01	-3.45186E+01	0.00000E+00	6.25389E-02	3.94208E-02	0.00000E+00	-3.94208E-02	0.00000E+00	0.00000E+00
5.33333E+00	3.45186E+01	-3.45186E+01	0.00000E+00	4.45109E-02	3.86832E-02	0.00000E+00	-3.86832E-02	0.00000E+00	0.00000E+00
5.36667E+00	3.45186E+01	-3.45186E+01	0.00000E+00	2.98362E-02	3.79360E-02	0.00000E+00	-3.79360E-02	0.00000E+00	0.00000E+00
5.40000E+00	3.45186E+01	-3.45186E+01	0.00000E+00	1.83088E-02	3.71814E-02	0.00000E+00	-3.71814E-02	0.00000E+00	0.00000E+00
5.43333E+00	3.45186E+01	-3.45186E+01	0.00000E+00	9.66800E-03	3.64218E-02	0.00000E+00	-3.64218E-02	0.00000E+00	0.00000E+00
5.46667E+00	3.45186E+01	-3.45186E+01	0.00000E+00	3.61276E-03	3.56594E-02	0.00000E+00	-3.56594E-02	0.00000E+00	0.00000E+00
5.50000E+00	3.45186E+01	-3.45186E+01	0.00000E+00	-1.78419E-04	3.48967E-02	0.00000E+00	-3.48967E-02	0.00000E+00	0.00000E+00
5.53333E+00	3.45186E+01	-3.45186E+01	0.00000E+00	-2.03556E-03	3.41362E-02	0.00000E+00	-3.41362E-02	0.00000E+00	0.00000E+00
5.56667E+00	3.45186E+01	-3.45186E+01	0.00000E+00	-2.28561E-03	3.33801E-02	0.00000E+00	-3.33801E-02	0.00000E+00	0.00000E+00
5.60000E+00	3.45186E+01	-3.45186E+01	0.00000E+00	-1.24326E-03	3.26307E-02	0.00000E+00	-3.26307E-02	0.00000E+00	0.00000E+00
5.63333E+00	3.45186E+01	-3.45186E+01	0.00000E+00	7.97069E-04	3.18899E-02	0.00000E+00	-3.18899E-02	0.00000E+00	0.00000E+00
5.66667E+00	3.45186E+01	-3.45186E+01	0.00000E+00	3.56625E-03	3.11594E-02	0.00000E+00	-3.11594E-02	0.00000E+00	0.00000E+00
5.70000E+00	3.45186E+01	-3.45186E+01	0.00000E+00	6.82374E-03	3.04408E-02	0.00000E+00	-3.04408E-02	0.00000E+00	0.00000E+00
5.73333E+00	3.45186E+01	-3.45186E+01	0.00000E+00	1.03596E-02	2.97353E-02	0.00000E+00	-2.97353E-02	0.00000E+00	0.00000E+00
5.76667E+00	3.45186E+01	-3.45186E+01	0.00000E+00	1.39949E-02	2.90438E-02	0.00000E+00	-2.90438E-02	0.00000E+00	0.00000E+00
5.80000E+00	3.45186E+01	-3.45186E+01	0.00000E+00	1.75818E-02	2.83671E-02	0.00000E+00	-2.83671E-02	0.00000E+00	0.00000E+00
5.83333E+00	3.45186E+01	-3.45186E+01	0.00000E+00	2.10018E-02	2.77056E-02	0.00000E+00	-2.77056E-02	0.00000E+00	0.00000E+00
5.86667E+00	3.45186E+01	-3.45186E+01	0.00000E+00	2.41644E-02	2.70595E-02	0.00000E+00	-2.70595E-02	0.00000E+00	0.00000E+00
5.90000E+00	3.45186E+01	-3.45186E+01	0.00000E+00	2.70043E-02	2.64289E-02	0.00000E+00	-2.64289E-02	0.00000E+00	0.00000E+00
5.93333E+00	3.45186E+01	-3.45186E+01	0.00000E+00	2.94785E-02	2.58136E-02	0.00000E+00	-2.58136E-02	0.00000E+00	0.00000E+00
5.96667E+00	3.45186E+01	-3.45186E+01	0.00000E+00	3.15634E-02	2.52135E-02	0.00000E+00	-2.52135E-02	0.00000E+00	0.00000E+00
6.00000E+00	3.45186E+01	-3.45186E+01	0.00000E+00	3.32525E-02	2.46282E-02	0.00000E+00	-2.46282E-02	0.00000E+00	0.00000E+00

1Boat 30 mph

Request Number

2003

Bullet Boat Acceleration

Acceleration of Marker 200100 relative to Marker 1002001

Time	Accm	Accx	Accy	Accz	Wmdot	Wxdot	Wydot	Wzdot
0.00000E+00	6.41979E+00	0.00000E+00	0.00000E+00	6.41979E+00	1.85504E+00	0.00000E+00	1.85504E+00	0.00000E+00
3.33333E-02	4.97738E+00	0.00000E+00	0.00000E+00	4.97738E+00	9.01222E-01	0.00000E+00	9.01222E-01	0.00000E+00
6.66667E-02	3.56705E+00	0.00000E+00	0.00000E+00	3.56705E+00	3.91083E-01	0.00000E+00	3.91083E-01	0.00000E+00
1.00000E-01	2.27398E+00	0.00000E+00	0.00000E+00	2.27398E+00	1.26696E-01	0.00000E+00	1.26696E-01	0.00000E+00
1.33333E-01	1.14670E+00	0.00000E+00	0.00000E+00	1.14670E+00	7.14627E-03	0.00000E+00	-7.14627E-03	0.00000E+00

1.66667E-01	1.86003E-01	0.00000E+00	0.00000E+00	1.86003E-01	7.51390E-02	0.00000E+00	-7.51390E-02	0.00000E+00
2.00000E-01	5.82167E-01	0.00000E+00	0.00000E+00	-5.82167E-01	1.01521E-01	0.00000E+00	-1.01521E-01	0.00000E+00
2.33333E-01	1.16125E+00	0.00000E+00	0.00000E+00	-1.16125E+00	1.10332E-01	0.00000E+00	-1.10332E-01	0.00000E+00
2.66667E-01	1.56636E+00	0.00000E+00	0.00000E+00	-1.56636E+00	1.11122E-01	0.00000E+00	-1.11122E-01	0.00000E+00
3.00000E-01	1.81901E+00	0.00000E+00	0.00000E+00	-1.81901E+00	1.07171E-01	0.00000E+00	-1.07171E-01	0.00000E+00
3.33333E-01	1.94288E+00	0.00000E+00	0.00000E+00	-1.94288E+00	1.00344E-01	0.00000E+00	-1.00344E-01	0.00000E+00
3.66667E-01	1.96219E+00	0.00000E+00	0.00000E+00	-1.96219E+00	9.15611E-02	0.00000E+00	-9.15611E-02	0.00000E+00
4.00000E-01	1.90009E+00	0.00000E+00	0.00000E+00	-1.90009E+00	8.22414E-02	0.00000E+00	-8.22414E-02	0.00000E+00
4.33333E-01	1.77586E+00	0.00000E+00	0.00000E+00	-1.77586E+00	7.31088E-02	0.00000E+00	-7.31088E-02	0.00000E+00
4.66667E-01	1.60743E+00	0.00000E+00	0.00000E+00	-1.60743E+00	6.45829E-02	0.00000E+00	-6.45829E-02	0.00000E+00
5.00000E-01	1.41014E+00	0.00000E+00	0.00000E+00	-1.41014E+00	5.68761E-02	0.00000E+00	-5.68761E-02	0.00000E+00
5.33333E-01	1.19652E+00	0.00000E+00	0.00000E+00	-1.19652E+00	5.00805E-02	0.00000E+00	-5.00805E-02	0.00000E+00
5.66667E-01	9.79542E-01	0.00000E+00	0.00000E+00	-9.79542E-01	4.42031E-02	0.00000E+00	-4.42031E-02	0.00000E+00
6.00000E-01	7.69469E-01	0.00000E+00	0.00000E+00	-7.69469E-01	3.92144E-02	0.00000E+00	-3.92144E-02	0.00000E+00
6.33333E-01	5.69905E-01	0.00000E+00	0.00000E+00	-5.69905E-01	3.50574E-02	0.00000E+00	-3.50574E-02	0.00000E+00
6.66667E-01	3.88522E-01	0.00000E+00	0.00000E+00	-3.88522E-01	3.16551E-02	0.00000E+00	-3.16551E-02	0.00000E+00
7.00000E-01	2.27788E-01	0.00000E+00	0.00000E+00	-2.27788E-01	2.89249E-02	0.00000E+00	-2.89249E-02	0.00000E+00
7.33333E-01	8.90269E-02	0.00000E+00	0.00000E+00	-8.90269E-02	2.67811E-02	0.00000E+00	-2.67811E-02	0.00000E+00
7.66667E-01	2.71596E-02	0.00000E+00	0.00000E+00	-2.71596E-02	2.51396E-02	0.00000E+00	-2.51396E-02	0.00000E+00
8.00000E-01	1.21086E-01	0.00000E+00	0.00000E+00	-1.21086E-01	2.39190E-02	0.00000E+00	-2.39190E-02	0.00000E+00
8.33333E-01	1.93825E-01	0.00000E+00	0.00000E+00	-1.93825E-01	2.30399E-02	0.00000E+00	-2.30399E-02	0.00000E+00
8.66667E-01	2.47000E-01	0.00000E+00	0.00000E+00	-2.47000E-01	2.24302E-02	0.00000E+00	-2.24302E-02	0.00000E+00
9.00000E-01	2.82573E-01	0.00000E+00	0.00000E+00	-2.82573E-01	2.20273E-02	0.00000E+00	-2.20273E-02	0.00000E+00
9.33333E-01	3.02805E-01	0.00000E+00	0.00000E+00	-3.02805E-01	2.17723E-02	0.00000E+00	-2.17723E-02	0.00000E+00
9.66667E-01	3.10048E-01	0.00000E+00	0.00000E+00	-3.10048E-01	2.16183E-02	0.00000E+00	-2.16183E-02	0.00000E+00
1.00000E+00	3.06633E-01	0.00000E+00	0.00000E+00	-3.06633E-01	2.15215E-02	0.00000E+00	-2.15215E-02	0.00000E+00
1.03333E+00	3.02316E-01	0.00000E+00	0.00000E+00	-3.02316E-01	2.12884E-02	0.00000E+00	-2.12884E-02	0.00000E+00
1.06667E+00	2.37463E-01	0.00000E+00	0.00000E+00	-2.37463E-01	2.07032E-02	0.00000E+00	-2.07032E-02	0.00000E+00
1.10000E+00	1.61727E-01	0.00000E+00	0.00000E+00	-1.61727E-01	1.97709E-02	0.00000E+00	-1.97709E-02	0.00000E+00
1.13333E+00	7.58289E-02	0.00000E+00	0.00000E+00	-7.58289E-02	1.87055E-02	0.00000E+00	-1.87055E-02	0.00000E+00
1.16667E+00	1.60691E-02	0.00000E+00	0.00000E+00	-1.60691E-02	1.77312E-02	0.00000E+00	-1.77312E-02	0.00000E+00
1.20000E+00	1.09317E-01	0.00000E+00	0.00000E+00	-1.09317E-01	1.69631E-02	0.00000E+00	-1.69631E-02	0.00000E+00
1.23333E+00	1.99630E-01	0.00000E+00	0.00000E+00	-1.99630E-01	1.64325E-02	0.00000E+00	-1.64325E-02	0.00000E+00
1.26667E+00	2.83266E-01	0.00000E+00	0.00000E+00	-2.83266E-01	1.61315E-02	0.00000E+00	-1.61315E-02	0.00000E+00
1.30000E+00	3.57007E-01	0.00000E+00	0.00000E+00	-3.57007E-01	1.60349E-02	0.00000E+00	-1.60349E-02	0.00000E+00
1.33333E+00	4.18078E-01	0.00000E+00	0.00000E+00	-4.18078E-01	1.61184E-02	0.00000E+00	-1.61184E-02	0.00000E+00
1.36667E+00	4.64161E-01	0.00000E+00	0.00000E+00	-4.64161E-01	1.63477E-02	0.00000E+00	-1.63477E-02	0.00000E+00
1.40000E+00	4.93546E-01	0.00000E+00	0.00000E+00	-4.93546E-01	1.66919E-02	0.00000E+00	-1.66919E-02	0.00000E+00
1.43333E+00	5.05245E-01	0.00000E+00	0.00000E+00	-5.05245E-01	1.71129E-02	0.00000E+00	-1.71129E-02	0.00000E+00
1.46667E+00	4.98948E-01	0.00000E+00	0.00000E+00	-4.98948E-01	1.75694E-02	0.00000E+00	-1.75694E-02	0.00000E+00
1.50000E+00	4.74975E-01	0.00000E+00	0.00000E+00	-4.74975E-01	1.80226E-02	0.00000E+00	-1.80226E-02	0.00000E+00
1.53333E+00	4.34341E-01	0.00000E+00	0.00000E+00	-4.34341E-01	1.84335E-02	0.00000E+00	-1.84335E-02	0.00000E+00
1.56667E+00	3.78679E-01	0.00000E+00	0.00000E+00	-3.78679E-01	1.87683E-02	0.00000E+00	-1.87683E-02	0.00000E+00
1.60000E+00	3.10273E-01	0.00000E+00	0.00000E+00	-3.10273E-01	1.89862E-02	0.00000E+00	-1.89862E-02	0.00000E+00
1.63333E+00	2.31782E-01	0.00000E+00	0.00000E+00	-2.31782E-01	1.90680E-02	0.00000E+00	-1.90680E-02	0.00000E+00
1.66667E+00	1.46209E-01	0.00000E+00	0.00000E+00	-1.46209E-01	1.89978E-02	0.00000E+00	-1.89978E-02	0.00000E+00
1.70000E+00	5.68001E-02	0.00000E+00	0.00000E+00	-5.68001E-02	1.87653E-02	0.00000E+00	-1.87653E-02	0.00000E+00
1.73333E+00	3.30982E-02	0.00000E+00	0.00000E+00	-3.30982E-02	1.83698E-02	0.00000E+00	-1.83698E-02	0.00000E+00
1.76667E+00	1.20154E-01	0.00000E+00	0.00000E+00	-1.20154E-01	1.78144E-02	0.00000E+00	-1.78144E-02	0.00000E+00
1.80000E+00	2.01190E-01	0.00000E+00	0.00000E+00	-2.01190E-01	1.71111E-02	0.00000E+00	-1.71111E-02	0.00000E+00
1.83333E+00	2.73281E-01	0.00000E+00	0.00000E+00	-2.73281E-01	1.62758E-02	0.00000E+00	-1.62758E-02	0.00000E+00
1.86667E+00	3.33872E-01	0.00000E+00	0.00000E+00	-3.33872E-01	1.53285E-02	0.00000E+00	-1.53285E-02	0.00000E+00
1.90000E+00	3.80846E-01	0.00000E+00	0.00000E+00	-3.80846E-01	1.42946E-02	0.00000E+00	-1.42946E-02	0.00000E+00
1.93333E+00	4.12596E-01	0.00000E+00	0.00000E+00	-4.12596E-01	1.31976E-02	0.00000E+00	-1.31976E-02	0.00000E+00

1.96667E+00	4.30010E-01	0.00000E+00	0.00000E+00	-4.30010E-01	1.24065E-02	0.00000E+00	-1.24065E-02	0.00000E+00
2.00000E+00	4.32096E-01	0.00000E+00	0.00000E+00	-4.32096E-01	1.16818E-02	0.00000E+00	-1.16818E-02	0.00000E+00
2.03333E+00	4.16986E-01	0.00000E+00	0.00000E+00	-4.16986E-01	1.06295E-02	0.00000E+00	-1.06295E-02	0.00000E+00
2.06667E+00	3.85350E-01	0.00000E+00	0.00000E+00	-3.85350E-01	9.46345E-03	0.00000E+00	-9.46345E-03	0.00000E+00
2.10000E+00	3.38516E-01	0.00000E+00	0.00000E+00	-3.38516E-01	8.35939E-03	0.00000E+00	-8.35939E-03	0.00000E+00
2.13333E+00	2.78380E-01	0.00000E+00	0.00000E+00	-2.78380E-01	7.32239E-03	0.00000E+00	-7.32239E-03	0.00000E+00
2.16667E+00	2.07331E-01	0.00000E+00	0.00000E+00	-2.07331E-01	6.39720E-03	0.00000E+00	-6.39720E-03	0.00000E+00
2.20000E+00	1.28142E-01	0.00000E+00	0.00000E+00	-1.28142E-01	5.62495E-03	0.00000E+00	-5.62495E-03	0.00000E+00
2.23333E+00	4.38820E-02	0.00000E+00	0.00000E+00	-4.38820E-02	5.02209E-03	0.00000E+00	-5.02209E-03	0.00000E+00
2.26667E+00	4.21939E-02	0.00000E+00	0.00000E+00	-4.21939E-02	4.60302E-03	0.00000E+00	-4.60302E-03	0.00000E+00
2.30000E+00	1.26809E-01	0.00000E+00	0.00000E+00	-1.26809E-01	4.37116E-03	0.00000E+00	-4.37116E-03	0.00000E+00
2.33333E+00	2.06744E-01	0.00000E+00	0.00000E+00	-2.06744E-01	4.32634E-03	0.00000E+00	-4.32634E-03	0.00000E+00
2.36667E+00	2.78982E-01	0.00000E+00	0.00000E+00	-2.78982E-01	4.46037E-03	0.00000E+00	-4.46037E-03	0.00000E+00
2.40000E+00	3.40704E-01	0.00000E+00	0.00000E+00	-3.40704E-01	4.75855E-03	0.00000E+00	-4.75855E-03	0.00000E+00
2.43333E+00	3.89646E-01	0.00000E+00	0.00000E+00	-3.89646E-01	5.19681E-03	0.00000E+00	-5.19681E-03	0.00000E+00
2.46667E+00	4.24008E-01	0.00000E+00	0.00000E+00	-4.24008E-01	5.74848E-03	0.00000E+00	-5.74848E-03	0.00000E+00
2.50000E+00	4.42549E-01	0.00000E+00	0.00000E+00	-4.42549E-01	6.38244E-03	0.00000E+00	-6.38244E-03	0.00000E+00
2.53333E+00	4.44651E-01	0.00000E+00	0.00000E+00	-4.44651E-01	7.06361E-03	0.00000E+00	-7.06361E-03	0.00000E+00
2.56667E+00	4.30342E-01	0.00000E+00	0.00000E+00	-4.30342E-01	7.75454E-03	0.00000E+00	-7.75454E-03	0.00000E+00
2.60000E+00	4.00553E-01	0.00000E+00	0.00000E+00	-4.00553E-01	8.41531E-03	0.00000E+00	-8.41531E-03	0.00000E+00
2.63333E+00	3.56072E-01	0.00000E+00	0.00000E+00	-3.56072E-01	9.02269E-03	0.00000E+00	-9.02269E-03	0.00000E+00
2.66667E+00	2.98821E-01	0.00000E+00	0.00000E+00	-2.98821E-01	9.54089E-03	0.00000E+00	-9.54089E-03	0.00000E+00
2.70000E+00	2.31043E-01	0.00000E+00	0.00000E+00	-2.31043E-01	9.94332E-03	0.00000E+00	-9.94332E-03	0.00000E+00
2.73333E+00	1.55411E-01	0.00000E+00	0.00000E+00	-1.55411E-01	1.02083E-02	0.00000E+00	-1.02083E-02	0.00000E+00
2.76667E+00	7.48223E-02	0.00000E+00	0.00000E+00	-7.48223E-02	1.03236E-02	0.00000E+00	-1.03236E-02	0.00000E+00
2.80000E+00	7.68725E-03	0.00000E+00	0.00000E+00	-7.68725E-03	1.02805E-02	0.00000E+00	-1.02805E-02	0.00000E+00
2.83333E+00	8.90207E-02	0.00000E+00	0.00000E+00	-8.90207E-02	1.00753E-02	0.00000E+00	-1.00753E-02	0.00000E+00
2.86667E+00	1.66163E-01	0.00000E+00	0.00000E+00	-1.66163E-01	9.71510E-03	0.00000E+00	-9.71510E-03	0.00000E+00
2.90000E+00	2.36253E-01	0.00000E+00	0.00000E+00	-2.36253E-01	9.20825E-03	0.00000E+00	-9.20825E-03	0.00000E+00
2.93333E+00	2.96637E-01	0.00000E+00	0.00000E+00	-2.96637E-01	8.56999E-03	0.00000E+00	-8.56999E-03	0.00000E+00
2.96667E+00	3.45163E-01	0.00000E+00	0.00000E+00	-3.45163E-01	7.82134E-03	0.00000E+00	-7.82134E-03	0.00000E+00
3.00000E+00	3.80133E-01	0.00000E+00	0.00000E+00	-3.80133E-01	6.98656E-03	0.00000E+00	-6.98656E-03	0.00000E+00
3.03333E+00	4.00324E-01	0.00000E+00	0.00000E+00	-4.00324E-01	6.09113E-03	0.00000E+00	-6.09113E-03	0.00000E+00
3.06667E+00	4.05095E-01	0.00000E+00	0.00000E+00	-4.05095E-01	5.16434E-03	0.00000E+00	-5.16434E-03	0.00000E+00
3.10000E+00	3.94366E-01	0.00000E+00	0.00000E+00	-3.94366E-01	4.23231E-03	0.00000E+00	-4.23231E-03	0.00000E+00
3.13333E+00	2.42640E-01	0.00000E+00	0.00000E+00	-2.42640E-01	4.45423E+00	0.00000E+00	4.45423E+00	0.00000E+00
3.16667E+00	2.55088E+00	0.00000E+00	0.00000E+00	-2.55088E+00	1.63383E+00	0.00000E+00	-1.63383E+00	0.00000E+00
3.20000E+00	3.40916E+00	0.00000E+00	0.00000E+00	-3.40916E+00	8.82567E-02	0.00000E+00	-8.82567E-02	0.00000E+00
3.23333E+00	3.43332E+00	0.00000E+00	0.00000E+00	-3.43332E+00	1.86001E-01	0.00000E+00	-1.86001E-01	0.00000E+00
3.26667E+00	3.43859E+00	0.00000E+00	0.00000E+00	-3.43859E+00	7.63833E-02	0.00000E+00	-7.63833E-02	0.00000E+00
3.30000E+00	3.32856E+01	0.00000E+00	0.00000E+00	-3.32856E+01	5.96223E+00	0.00000E+00	-5.96223E+00	0.00000E+00
3.33333E+00	1.65002E+02	0.00000E+00	0.00000E+00	-1.65002E+02	2.56316E+01	0.00000E+00	-2.56316E+01	0.00000E+00
3.36667E+00	1.45085E+02	0.00000E+00	0.00000E+00	-1.45085E+02	1.26888E+01	0.00000E+00	-1.26888E+01	0.00000E+00
3.40000E+00	1.59512E+01	0.00000E+00	0.00000E+00	-1.59512E+01	1.80710E+01	0.00000E+00	-1.80710E+01	0.00000E+00
3.43333E+00	2.16478E+01	0.00000E+00	0.00000E+00	-2.16478E+01	1.32843E+01	0.00000E+00	-1.32843E+01	0.00000E+00
3.46667E+00	2.53454E+01	0.00000E+00	0.00000E+00	-2.53454E+01	6.44893E+00	0.00000E+00	-6.44893E+00	0.00000E+00
3.50000E+00	2.78336E+01	0.00000E+00	0.00000E+00	-2.78336E+01	3.04613E+00	0.00000E+00	-3.04613E+00	0.00000E+00
3.53333E+00	2.18809E+01	0.00000E+00	0.00000E+00	-2.18809E+01	2.05895E+00	0.00000E+00	-2.05895E+00	0.00000E+00
3.56667E+00	1.70205E+01	0.00000E+00	0.00000E+00	-1.70205E+01	1.93442E+00	0.00000E+00	-1.93442E+00	0.00000E+00
3.60000E+00	1.02549E+01	0.00000E+00	0.00000E+00	-1.02549E+01	2.29594E+00	0.00000E+00	-2.29594E+00	0.00000E+00
3.63333E+00	2.40887E+01	0.00000E+00	0.00000E+00	-2.40887E+01	8.69928E-01	0.00000E+00	-8.69928E-01	0.00000E+00
3.66667E+00	3.24385E+01	0.00000E+00	0.00000E+00	-3.24385E+01	1.19751E+00	0.00000E+00	-1.19751E+00	0.00000E+00
3.70000E+00	3.24893E+01	0.00000E+00	0.00000E+00	-3.24893E+01	5.63818E-01	0.00000E+00	-5.63818E-01	0.00000E+00
3.73333E+00	3.24447E+01	0.00000E+00	0.00000E+00	-3.24447E+01	2.80834E-01	0.00000E+00	-2.80834E-01	0.00000E+00

3.76667E+00	3.23740E+01	3.22000E+00	0.00000E+00	-3.22134E+01	1.44826E-01	0.00000E+00	1.44826E-01	0.00000E+00
3.80000E+00	3.23034E+01	3.22000E+00	0.00000E+00	-3.21425E+01	7.38959E-02	0.00000E+00	7.38959E-02	0.00000E+00
3.83333E+00	1.86196E+01	5.79633E+00	0.00000E+00	-1.76945E+01	1.96194E+00	0.00000E+00	-1.96194E+00	0.00000E+00
3.86667E+00	1.41028E+01	-6.49669E+00	0.00000E+00	-1.25173E+01	1.15361E+00	0.00000E+00	-1.15361E+00	0.00000E+00
3.90000E+00	3.18529E+01	0.00000E+00	0.00000E+00	-3.18529E+01	1.47935E+00	0.00000E+00	1.47935E+00	0.00000E+00
3.93333E+00	3.16185E+01	0.00000E+00	0.00000E+00	-3.16185E+01	7.04342E-01	0.00000E+00	7.04342E-01	0.00000E+00
3.96667E+00	3.11780E+01	0.00000E+00	0.00000E+00	-3.11780E+01	2.87630E-01	0.00000E+00	2.87630E-01	0.00000E+00
4.00000E+00	3.03334E+01	0.00000E+00	0.00000E+00	-3.03334E+01	4.98961E-02	0.00000E+00	4.98961E-02	0.00000E+00
4.03333E+00	1.07682E+01	0.00000E+00	0.00000E+00	1.07682E+01	8.43088E-02	0.00000E+00	-8.43088E-02	0.00000E+00
4.06667E+00	1.04633E+01	0.00000E+00	0.00000E+00	1.04633E+01	1.66687E-01	0.00000E+00	-1.66687E-01	0.00000E+00
4.10000E+00	1.03711E+01	0.00000E+00	0.00000E+00	1.03711E+01	2.12337E-01	0.00000E+00	-2.12337E-01	0.00000E+00
4.13333E+00	1.05349E+01	0.00000E+00	0.00000E+00	1.05349E+01	2.29398E-01	0.00000E+00	-2.29398E-01	0.00000E+00
4.16667E+00	1.08373E+01	0.00000E+00	0.00000E+00	1.08373E+01	2.25786E-01	0.00000E+00	-2.25786E-01	0.00000E+00
4.20000E+00	1.12214E+01	0.00000E+00	0.00000E+00	1.12214E+01	2.07220E-01	0.00000E+00	-2.07220E-01	0.00000E+00
4.23333E+00	1.15775E+01	0.00000E+00	0.00000E+00	1.15775E+01	1.74936E-01	0.00000E+00	-1.74936E-01	0.00000E+00
4.26667E+00	1.18519E+01	0.00000E+00	0.00000E+00	1.18519E+01	1.36490E-01	0.00000E+00	-1.36490E-01	0.00000E+00
4.30000E+00	1.19978E+01	0.00000E+00	0.00000E+00	1.19978E+01	9.62647E-02	0.00000E+00	-9.62647E-02	0.00000E+00
4.33333E+00	1.19677E+01	0.00000E+00	0.00000E+00	1.19677E+01	5.60731E-02	0.00000E+00	-5.60731E-02	0.00000E+00
4.36667E+00	1.17402E+01	0.00000E+00	0.00000E+00	1.17402E+01	2.14031E-02	0.00000E+00	-2.14031E-02	0.00000E+00
4.40000E+00	1.13239E+01	0.00000E+00	0.00000E+00	1.13239E+01	6.90375E-03	0.00000E+00	-6.90375E-03	0.00000E+00
4.43333E+00	1.07218E+01	0.00000E+00	0.00000E+00	1.07218E+01	2.62933E-02	0.00000E+00	-2.62933E-02	0.00000E+00
4.46667E+00	9.93760E+00	0.00000E+00	0.00000E+00	9.93760E+00	3.58399E-02	0.00000E+00	-3.58399E-02	0.00000E+00
4.50000E+00	9.03370E+00	0.00000E+00	0.00000E+00	9.03370E+00	4.22014E-02	0.00000E+00	-4.22014E-02	0.00000E+00
4.53333E+00	8.04715E+00	0.00000E+00	0.00000E+00	8.04715E+00	4.53865E-02	0.00000E+00	-4.53865E-02	0.00000E+00
4.56667E+00	7.01433E+00	0.00000E+00	0.00000E+00	7.01433E+00	4.56613E-02	0.00000E+00	-4.56613E-02	0.00000E+00
4.60000E+00	5.96966E+00	0.00000E+00	0.00000E+00	5.96966E+00	4.36753E-02	0.00000E+00	-4.36753E-02	0.00000E+00
4.63333E+00	4.93656E+00	0.00000E+00	0.00000E+00	4.93656E+00	3.89701E-02	0.00000E+00	-3.89701E-02	0.00000E+00
4.66667E+00	3.95190E+00	0.00000E+00	0.00000E+00	3.95190E+00	3.43654E-02	0.00000E+00	-3.43654E-02	0.00000E+00
4.70000E+00	3.03781E+00	0.00000E+00	0.00000E+00	3.03781E+00	3.04006E-02	0.00000E+00	-3.04006E-02	0.00000E+00
4.73333E+00	2.20876E+00	0.00000E+00	0.00000E+00	2.20876E+00	2.70280E-02	0.00000E+00	-2.70280E-02	0.00000E+00
4.76667E+00	1.47409E+00	0.00000E+00	0.00000E+00	1.47409E+00	2.42225E-02	0.00000E+00	-2.42225E-02	0.00000E+00
4.80000E+00	8.38478E-01	0.00000E+00	0.00000E+00	8.38478E-01	2.19856E-02	0.00000E+00	-2.19856E-02	0.00000E+00
4.83333E+00	3.03392E-01	0.00000E+00	0.00000E+00	3.03392E-01	2.03148E-02	0.00000E+00	-2.03148E-02	0.00000E+00
4.86667E+00	1.35150E-01	0.00000E+00	0.00000E+00	-1.35150E-01	1.91567E-02	0.00000E+00	1.91567E-02	0.00000E+00
4.90000E+00	4.82510E-01	0.00000E+00	0.00000E+00	-4.82510E-01	1.84427E-02	0.00000E+00	1.84427E-02	0.00000E+00
4.93333E+00	7.45909E-01	0.00000E+00	0.00000E+00	-7.45909E-01	1.80918E-02	0.00000E+00	1.80918E-02	0.00000E+00
4.96667E+00	9.33851E-01	0.00000E+00	0.00000E+00	-9.33851E-01	1.80235E-02	0.00000E+00	1.80235E-02	0.00000E+00
5.00000E+00	1.05557E+00	0.00000E+00	0.00000E+00	-1.05557E+00	1.81654E-02	0.00000E+00	1.81654E-02	0.00000E+00
5.03333E+00	1.12056E+00	0.00000E+00	0.00000E+00	-1.12056E+00	1.84541E-02	0.00000E+00	1.84541E-02	0.00000E+00
5.06667E+00	1.13814E+00	0.00000E+00	0.00000E+00	-1.13814E+00	1.88423E-02	0.00000E+00	1.88423E-02	0.00000E+00
5.10000E+00	1.11725E+00	0.00000E+00	0.00000E+00	-1.11725E+00	1.92896E-02	0.00000E+00	1.92896E-02	0.00000E+00
5.13333E+00	1.06616E+00	0.00000E+00	0.00000E+00	-1.06616E+00	1.97675E-02	0.00000E+00	1.97675E-02	0.00000E+00
5.16667E+00	9.92441E-01	0.00000E+00	0.00000E+00	-9.92441E-01	2.02534E-02	0.00000E+00	2.02534E-02	0.00000E+00
5.20000E+00	9.02809E-01	0.00000E+00	0.00000E+00	-9.02809E-01	2.07289E-02	0.00000E+00	2.07289E-02	0.00000E+00
5.23333E+00	8.03137E-01	0.00000E+00	0.00000E+00	-8.03137E-01	2.11806E-02	0.00000E+00	2.11806E-02	0.00000E+00
5.26667E+00	6.98432E-01	0.00000E+00	0.00000E+00	-6.98432E-01	2.15964E-02	0.00000E+00	2.15964E-02	0.00000E+00
5.30000E+00	5.92860E-01	0.00000E+00	0.00000E+00	-5.92860E-01	2.19663E-02	0.00000E+00	2.19663E-02	0.00000E+00
5.33333E+00	4.89798E-01	0.00000E+00	0.00000E+00	-4.89798E-01	2.22820E-02	0.00000E+00	2.22820E-02	0.00000E+00
5.36667E+00	3.91860E-01	0.00000E+00	0.00000E+00	-3.91860E-01	2.25377E-02	0.00000E+00	2.25377E-02	0.00000E+00
5.40000E+00	3.01089E-01	0.00000E+00	0.00000E+00	-3.01089E-01	2.27254E-02	0.00000E+00	2.27254E-02	0.00000E+00
5.43333E+00	2.18861E-01	0.00000E+00	0.00000E+00	-2.18861E-01	2.28428E-02	0.00000E+00	2.28428E-02	0.00000E+00
5.46667E+00	1.46041E-01	0.00000E+00	0.00000E+00	-1.46041E-01	2.28875E-02	0.00000E+00	2.28875E-02	0.00000E+00
5.50000E+00	8.30672E-02	0.00000E+00	0.00000E+00	-8.30672E-02	2.28596E-02	0.00000E+00	2.28596E-02	0.00000E+00
5.53333E+00	3.00019E-02	0.00000E+00	0.00000E+00	-3.00019E-02	2.27602E-02	0.00000E+00	2.27602E-02	0.00000E+00

boat30.out

Thu Oct 31 12:22:24 1991

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Time	Fm	Fx	Fy	Fz	Tqm	Tqx	Tqy	Tqz
0.00000E+00	4.85967E+03	0.00000E+00	0.00000E+00	4.85967E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E-02	4.83270E+03	0.00000E+00	0.00000E+00	4.83270E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.66667E-02	4.76482E+03	0.00000E+00	0.00000E+00	4.76482E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.00000E-01	4.67057E+03	0.00000E+00	0.00000E+00	4.67057E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.33333E-01	4.56149E+03	0.00000E+00	0.00000E+00	4.56149E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.66667E-01	4.44609E+03	0.00000E+00	0.00000E+00	4.44609E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.00000E-01	4.33041E+03	0.00000E+00	0.00000E+00	4.33041E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.33333E-01	4.22041E+03	0.00000E+00	0.00000E+00	4.22041E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.66667E-01	4.11984E+03	0.00000E+00	0.00000E+00	4.11984E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.00000E-01	4.03080E+03	0.00000E+00	0.00000E+00	4.03080E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E-01	3.95456E+03	0.00000E+00	0.00000E+00	3.95456E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.66667E-01	3.89118E+03	0.00000E+00	0.00000E+00	3.89118E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.00000E-01	3.84045E+03	0.00000E+00	0.00000E+00	3.84045E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.33333E-01	3.80173E+03	0.00000E+00	0.00000E+00	3.80173E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.66667E-01	3.77408E+03	0.00000E+00	0.00000E+00	3.77408E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.00000E-01	3.75641E+03	0.00000E+00	0.00000E+00	3.75641E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.33333E-01	3.74753E+03	0.00000E+00	0.00000E+00	3.74753E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.66667E-01	3.74602E+03	0.00000E+00	0.00000E+00	3.74602E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.00000E-01	3.75055E+03	0.00000E+00	0.00000E+00	3.75055E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.33333E-01	3.75985E+03	0.00000E+00	0.00000E+00	3.75985E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.66667E-01	3.77274E+03	0.00000E+00	0.00000E+00	3.77274E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
7.00000E-01	3.78813E+03	0.00000E+00	0.00000E+00	3.78813E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
7.33333E-01	3.80509E+03	0.00000E+00	0.00000E+00	3.80509E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
7.66667E-01	3.82282E+03	0.00000E+00	0.00000E+00	3.82282E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
8.00000E-01	3.84064E+03	0.00000E+00	0.00000E+00	3.84064E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
8.33333E-01	3.85800E+03	0.00000E+00	0.00000E+00	3.85800E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
8.66667E-01	3.87449E+03	0.00000E+00	0.00000E+00	3.87449E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9.00000E-01	3.88979E+03	0.00000E+00	0.00000E+00	3.88979E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9.33333E-01	3.90369E+03	0.00000E+00	0.00000E+00	3.90369E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9.66667E-01	3.91609E+03	0.00000E+00	0.00000E+00	3.91609E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.00000E+00	3.92695E+03	0.00000E+00	0.00000E+00	3.92695E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.03333E+00	3.93706E+03	0.00000E+00	0.00000E+00	3.93706E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.06667E+00	3.94780E+03	0.00000E+00	0.00000E+00	3.94780E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

1Boat 30 mph  
Request Number 2004

Bullet Boat Forces

Force exerted on Marker 200100 by Marker 1002001

[illegible]

2.900000E+00	3.99452E+03	0.00000E+00	0.00000E+00	3.99452E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.933333E+00	3.98622E+03	0.00000E+00	0.00000E+00	3.98622E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.96667E+00	3.97959E+03	0.00000E+00	0.00000E+00	3.97959E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.00000E+00	3.97487E+03	0.00000E+00	0.00000E+00	3.97487E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.033333E+00	3.97224E+03	0.00000E+00	0.00000E+00	3.97224E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.06667E+00	3.97180E+03	0.00000E+00	0.00000E+00	3.97180E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.10000E+00	3.97357E+03	0.00000E+00	0.00000E+00	3.97357E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.133333E+00	3.97500E+00	0.00000E+00	0.00000E+00	3.97500E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.16667E+00	3.92211E+03	0.00000E+00	0.00000E+00	3.92211E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.20000E+00	3.88075E+03	0.00000E+00	0.00000E+00	3.88075E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.233333E+00	3.86935E+03	0.00000E+00	0.00000E+00	3.86935E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.26667E+00	3.86350E+03	0.00000E+00	0.00000E+00	3.86350E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.30000E+00	3.86504E+03	0.00000E+00	0.00000E+00	3.86504E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.333333E+00	3.86853E+03	0.00000E+00	0.00000E+00	3.86853E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.36667E+00	2.99831E+03	0.00000E+00	0.00000E+00	2.99831E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.40000E+00	2.99333E+03	0.00000E+00	0.00000E+00	2.99333E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.433333E+00	1.41531E+03	0.00000E+00	0.00000E+00	1.41531E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.46667E+00	9.13754E+02	0.00000E+00	0.00000E+00	9.13754E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.50000E+00	5.50859E+02	0.00000E+00	0.00000E+00	5.50859E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.533333E+00	3.04987E+02	0.00000E+00	0.00000E+00	3.04987E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.56667E+00	1.46125E+02	0.00000E+00	0.00000E+00	1.46125E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.60000E+00	5.44974E+01	0.00000E+00	0.00000E+00	5.44974E+01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.633333E+00	1.22284E+01	0.00000E+00	0.00000E+00	1.22284E+01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.66667E+00	2.35169E+00	0.00000E+00	0.00000E+00	2.35169E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.70000E+00	1.18225E-01	0.00000E+00	0.00000E+00	1.18225E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0

4.70000E+00	4.87821E+03	0.00000E+00	0.00000E+00	4.87821E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.73333E+00	4.83899E+03	0.00000E+00	0.00000E+00	4.83899E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.76667E+00	4.78863E+03	0.00000E+00	0.00000E+00	4.78863E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.80000E+00	4.73085E+03	0.00000E+00	0.00000E+00	4.73085E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.83333E+00	4.66902E+03	0.00000E+00	0.00000E+00	4.66902E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.86667E+00	4.60572E+03	0.00000E+00	0.00000E+00	4.60572E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.90000E+00	4.54313E+03	0.00000E+00	0.00000E+00	4.54313E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.93333E+00	4.48298E+03	0.00000E+00	0.00000E+00	4.48298E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.96667E+00	4.42657E+03	0.00000E+00	0.00000E+00	4.42657E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.00000E+00	4.37479E+03	0.00000E+00	0.00000E+00	4.37479E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.03333E+00	4.32823E+03	0.00000E+00	0.00000E+00	4.32823E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.06667E+00	4.28718E+03	0.00000E+00	0.00000E+00	4.28718E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.10000E+00	4.25171E+03	0.00000E+00	0.00000E+00	4.25171E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.13333E+00	4.22171E+03	0.00000E+00	0.00000E+00	4.22171E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.16667E+00	4.19694E+03	0.00000E+00	0.00000E+00	4.19694E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.20000E+00	4.17703E+03	0.00000E+00	0.00000E+00	4.17703E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.23333E+00	4.16155E+03	0.00000E+00	0.00000E+00	4.16155E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.26667E+00	4.15003E+03	0.00000E+00	0.00000E+00	4.15003E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.30000E+00	4.14195E+03	0.00000E+00	0.00000E+00	4.14195E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.33333E+00	4.13682E+03	0.00000E+00	0.00000E+00	4.13682E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.36667E+00	4.13413E+03	0.00000E+00	0.00000E+00	4.13413E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.40000E+00	4.13341E+03	0.00000E+00	0.00000E+00	4.13341E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.43333E+00	4.13421E+03	0.00000E+00	0.00000E+00	4.13421E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.46667E+00	4.13612E+03	0.00000E+00	0.00000E+00	4.13612E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.50000E+00	4.13880E+03	0.00000E+00	0.00000E+00	4.13880E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.53333E+00	4.14191E+03	0.00000E+00	0.00000E+00	4.14191E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.56667E+00	4.14520E+03	0.00000E+00	0.00000E+00	4.14520E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.60000E+00	4.14843E+03	0.00000E+00	0.00000E+00	4.14843E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.63333E+00	4.15142E+03	0.00000E+00	0.00000E+00	4.15142E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.66667E+00	4.15406E+03	0.00000E+00	0.00000E+00	4.15406E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.70000E+00	4.15623E+03	0.00000E+00	0.00000E+00	4.15623E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.73333E+00	4.15787E+03	0.00000E+00	0.00000E+00	4.15787E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.76667E+00	4.15895E+03	0.00000E+00	0.00000E+00	4.15895E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.80000E+00	4.15945E+03	0.00000E+00	0.00000E+00	4.15945E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.83333E+00	4.15940E+03	0.00000E+00	0.00000E+00	4.15940E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.86667E+00	4.15881E+03	0.00000E+00	0.00000E+00	4.15881E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.90000E+00	4.15773E+03	0.00000E+00	0.00000E+00	4.15773E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.93333E+00	4.15621E+03	0.00000E+00	0.00000E+00	4.15621E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.96667E+00	4.15430E+03	0.00000E+00	0.00000E+00	4.15430E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.00000E+00	4.15206E+03	0.00000E+00	0.00000E+00	4.15206E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

1Boat 30 mph

Request Number 20881

Displacement of Marker 2088 relative to Marker 100

Time	Mag	X	Y	Z	Yaw	Pitch	Roll
0.00000E+00	1.80000E+01	1.80000E+01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E-02	1.65330E+01	1.65327E+01	0.00000E+00	9.93490E-02	0.00000E+00	-4.79338E-02	0.00000E+00
6.66667E-02	1.50885E+01	1.50651E+01	0.00000E+00	3.24669E-01	0.00000E+00	-1.55993E-01	0.00000E+00
1.00000E-01	1.36114E+01	1.35977E+01	0.00000E+00	6.11573E-01	0.00000E+00	-2.92789E-01	0.00000E+00
1.33333E-01	1.21660E+01	1.21310E+01	0.00000E+00	9.22106E-01	0.00000E+00	-4.40915E-01	0.00000E+00
1.66667E-01	1.07364E+01	1.06650E+01	0.00000E+00	1.23603E+00	0.00000E+00	-5.48407E-01	0.00000E+00
2.00000E-01	9.32835E+00	9.19981E+00	0.00000E+00	1.54328E+00	0.00000E+00	-7.33209E-01	0.00000E+00
2.33333E-01	7.95009E+00	7.73520E+00	0.00000E+00	1.83593E+00	0.00000E+00	-8.71037E-01	0.00000E+00
2.66667E-01	6.61702E+00	6.27109E+00	0.00000E+00	2.11148E+00	0.00000E+00	-1.00100E+00	0.00000E+00



3.00000E-01	5.35983E+00	4.80737E+00	0.00000E+00	2.37002E+00	0.00000E+00	-1.12335E+00	0.00000E+00
3.33333E-01	4.24338E+00	3.34396E+00	0.00000E+00	2.61233E+00	0.00000E+00	-1.23864E+00	0.00000E+00
3.66667E-01	3.40607E+00	1.88079E+00	0.00000E+00	2.83970E+00	0.00000E+00	-1.34755E+00	0.00000E+00
4.00000E-01	3.08176E+00	4.17823E-01	0.00000E+00	3.05330E+00	0.00000E+00	-1.45068E+00	0.00000E+00
4.33333E-01	3.41799E+00	-1.04499E+00	0.00000E+00	3.25433E+00	0.00000E+00	-1.54857E+00	0.00000E+00
4.66667E-01	4.26026E+00	-2.50767E+00	0.00000E+00	3.44404E+00	0.00000E+00	-1.64181E+00	0.00000E+00
5.00000E-01	5.37530E+00	-3.97025E+00	0.00000E+00	3.62366E+00	0.00000E+00	-1.73090E+00	0.00000E+00
5.33333E-01	6.62656E+00	-5.43274E+00	0.00000E+00	3.79430E+00	0.00000E+00	-1.81631E+00	0.00000E+00
5.66667E-01	7.94999E+00	-6.89514E+00	0.00000E+00	3.95720E+00	0.00000E+00	-1.89852E+00	0.00000E+00
6.00000E-01	9.31489E+00	-8.35746E+00	0.00000E+00	4.11339E+00	0.00000E+00	-1.97793E+00	0.00000E+00
6.33333E-01	1.07054E+01	-9.81971E+00	0.00000E+00	4.26373E+00	0.00000E+00	-2.05485E+00	0.00000E+00
6.66667E-01	1.21128E+01	-1.12819E+01	0.00000E+00	4.40896E+00	0.00000E+00	-2.12954E+00	0.00000E+00
7.00000E-01	1.35318E+01	-1.27440E+01	0.00000E+00	4.54973E+00	0.00000E+00	-2.20222E+00	0.00000E+00
7.33333E-01	1.49591E+01	-1.42060E+01	0.00000E+00	4.68654E+00	0.00000E+00	-2.27306E+00	0.00000E+00
7.66667E-01	1.63926E+01	-1.56680E+01	0.00000E+00	4.81982E+00	0.00000E+00	-2.34219E+00	0.00000E+00
8.00000E-01	1.78308E+01	-1.71300E+01	0.00000E+00	4.94992E+00	0.00000E+00	-2.40972E+00	0.00000E+00
8.33333E-01	1.92726E+01	-1.85919E+01	0.00000E+00	5.07709E+00	0.00000E+00	-2.47573E+00	0.00000E+00
8.66667E-01	2.07173E+01	-2.00537E+01	0.00000E+00	5.20152E+00	0.00000E+00	-2.54026E+00	0.00000E+00
9.00000E-01	2.21643E+01	-2.15155E+01	0.00000E+00	5.32337E+00	0.00000E+00	-2.60337E+00	0.00000E+00
9.33333E-01	2.36131E+01	-2.29773E+01	0.00000E+00	5.44271E+00	0.00000E+00	-2.66508E+00	0.00000E+00
9.66667E-01	2.50635E+01	-2.44391E+01	0.00000E+00	5.55961E+00	0.00000E+00	-2.72540E+00	0.00000E+00
1.00000E+00	2.65131E+01	-2.59008E+01	0.00000E+00	5.67408E+00	0.00000E+00	-2.78434E+00	0.00000E+00
1.03333E+00	2.79677E+01	-2.73626E+01	0.00000E+00	5.78600E+00	0.00000E+00	-2.84191E+00	0.00000E+00
1.06667E+00	2.94210E+01	-2.88244E+01	0.00000E+00	5.89512E+00	0.00000E+00	-2.89813E+00	0.00000E+00
1.10000E+00	3.08750E+01	-3.02861E+01	0.00000E+00	6.00132E+00	0.00000E+00	-2.95304E+00	0.00000E+00
1.13333E+00	3.23295E+01	-3.17479E+01	0.00000E+00	6.10474E+00	0.00000E+00	-3.00668E+00	0.00000E+00
1.16667E+00	3.37845E+01	-3.32097E+01	0.00000E+00	6.20561E+00	0.00000E+00	-3.05913E+00	0.00000E+00
1.20000E+00	3.52400E+01	-3.46715E+01	0.00000E+00	6.30419E+00	0.00000E+00	-3.11044E+00	0.00000E+00
1.23333E+00	3.66959E+01	-3.61333E+01	0.00000E+00	6.40071E+00	0.00000E+00	-3.16067E+00	0.00000E+00
1.26667E+00	3.81521E+01	-3.75951E+01	0.00000E+00	6.49535E+00	0.00000E+00	-3.20984E+00	0.00000E+00
1.30000E+00	3.96088E+01	-3.90570E+01	0.00000E+00	6.58824E+00	0.00000E+00	-3.25799E+00	0.00000E+00
1.33333E+00	4.10657E+01	-4.05189E+01	0.00000E+00	6.67948E+00	0.00000E+00	-3.30512E+00	0.00000E+00
1.36667E+00	4.25230E+01	-4.19808E+01	0.00000E+00	6.76913E+00	0.00000E+00	-3.35123E+00	0.00000E+00
1.40000E+00	4.39806E+01	-4.34427E+01	0.00000E+00	6.85721E+00	0.00000E+00	-3.39630E+00	0.00000E+00
1.43333E+00	4.54384E+01	-4.49047E+01	0.00000E+00	6.94371E+00	0.00000E+00	-3.44030E+00	0.00000E+00
1.46667E+00	4.68964E+01	-4.63667E+01	0.00000E+00	7.02857E+00	0.00000E+00	-3.48321E+00	0.00000E+00
1.50000E+00	4.83547E+01	-4.78288E+01	0.00000E+00	7.11175E+00	0.00000E+00	-3.52501E+00	0.00000E+00
1.53333E+00	4.98131E+01	-4.92910E+01	0.00000E+00	7.19316E+00	0.00000E+00	-3.56566E+00	0.00000E+00
1.56667E+00	5.12716E+01	-5.07532E+01	0.00000E+00	7.27269E+00	0.00000E+00	-3.60513E+00	0.00000E+00
1.60000E+00	5.27303E+01	-5.22155E+01	0.00000E+00	7.35026E+00	0.00000E+00	-3.64341E+00	0.00000E+00
1.63333E+00	5.41891E+01	-5.36779E+01	0.00000E+00	7.42574E+00	0.00000E+00	-3.68048E+00	0.00000E+00
1.66667E+00	5.56480E+01	-5.51404E+01	0.00000E+00	7.49906E+00	0.00000E+00	-3.71634E+00	0.00000E+00
1.70000E+00	5.71070E+01	-5.66030E+01	0.00000E+00	7.57011E+00	0.00000E+00	-3.75099E+00	0.00000E+00
1.73333E+00	5.85660E+01	-5.80657E+01	0.00000E+00	7.63884E+00	0.00000E+00	-3.78445E+00	0.00000E+00
1.76667E+00	6.00251E+01	-5.95285E+01	0.00000E+00	7.70519E+00	0.00000E+00	-3.81673E+00	0.00000E+00
1.80000E+00	6.14843E+01	-6.09914E+01	0.00000E+00	7.76913E+00	0.00000E+00	-3.84789E+00	0.00000E+00
1.83333E+00	6.29434E+01	-6.24544E+01	0.00000E+00	7.83067E+00	0.00000E+00	-3.87795E+00	0.00000E+00
1.86667E+00	6.44026E+01	-6.39175E+01	0.00000E+00	7.88984E+00	0.00000E+00	-3.90698E+00	0.00000E+00
1.90000E+00	6.58619E+01	-6.53807E+01	0.00000E+00	7.94668E+00	0.00000E+00	-3.93504E+00	0.00000E+00
1.93333E+00	6.73212E+01	-6.68440E+01	0.00000E+00	8.00128E+00	0.00000E+00	-3.96218E+00	0.00000E+00
1.96667E+00	6.87805E+01	-6.83073E+01	0.00000E+00	8.05373E+00	0.00000E+00	-3.98848E+00	0.00000E+00
2.00000E+00	7.02399E+01	-6.97708E+01	0.00000E+00	8.10413E+00	0.00000E+00	-4.01400E+00	0.00000E+00
2.03333E+00	7.16993E+01	-7.12343E+01	0.00000E+00	8.15258E+00	0.00000E+00	-4.03877E+00	0.00000E+00
2.06667E+00	7.31588E+01	-7.26978E+01	0.00000E+00	8.19920E+00	0.00000E+00	-4.06287E+00	0.00000E+00

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2.10000E+00	7.46183E+01	-7.41615E+01	0.00000E+00	8.24418E+00	0.00000E+00	-4.08636E+00	0.00000E+00
2.13333E+00	7.60779E+01	-7.56251E+01	0.00000E+00	8.28771E+00	0.00000E+00	-4.10932E+00	0.00000E+00
2.16667E+00	7.75376E+01	-7.70889E+01	0.00000E+00	8.33001E+00	0.00000E+00	-4.1181E+00	0.00000E+00
2.20000E+00	7.89974E+01	-7.85526E+01	0.00000E+00	8.37126E+00	0.00000E+00	-4.15389E+00	0.00000E+00
2.23333E+00	8.04573E+01	-8.00164E+01	0.00000E+00	8.41164E+00	0.00000E+00	-4.17561E+00	0.00000E+00
2.26667E+00	8.19174E+01	-8.14802E+01	0.00000E+00	8.45134E+00	0.00000E+00	-4.19701E+00	0.00000E+00
2.30000E+00	8.33775E+01	-8.29441E+01	0.00000E+00	8.49049E+00	0.00000E+00	-4.21812E+00	0.00000E+00
2.33333E+00	8.48378E+01	-8.44079E+01	0.00000E+00	8.52922E+00	0.00000E+00	-4.23895E+00	0.00000E+00
2.36667E+00	8.62982E+01	-8.58718E+01	0.00000E+00	8.56762E+00	0.00000E+00	-4.25950E+00	0.00000E+00
2.40000E+00	8.77587E+01	-8.73357E+01	0.00000E+00	8.60571E+00	0.00000E+00	-4.27977E+00	0.00000E+00
2.43333E+00	8.92193E+01	-8.87997E+01	0.00000E+00	8.64368E+00	0.00000E+00	-4.29973E+00	0.00000E+00
2.46667E+00	9.06801E+01	-9.02636E+01	0.00000E+00	8.68136E+00	0.00000E+00	-4.31936E+00	0.00000E+00
2.50000E+00	9.21411E+01	-9.17276E+01	0.00000E+00	8.71878E+00	0.00000E+00	-4.33863E+00	0.00000E+00
2.53333E+00	9.36021E+01	-9.31917E+01	0.00000E+00	8.75877E+00	0.00000E+00	-4.35749E+00	0.00000E+00
2.56667E+00	9.50633E+01	-9.46558E+01	0.00000E+00	8.79256E+00	0.00000E+00	-4.37590E+00	0.00000E+00
2.60000E+00	9.65245E+01	-9.61199E+01	0.00000E+00	8.82870E+00	0.00000E+00	-4.39381E+00	0.00000E+00
2.63333E+00	9.79859E+01	-9.75841E+01	0.00000E+00	8.86425E+00	0.00000E+00	-4.41119E+00	0.00000E+00
2.66667E+00	9.94474E+01	-9.90484E+01	0.00000E+00	8.89904E+00	0.00000E+00	-4.42800E+00	0.00000E+00
2.70000E+00	1.00909E+02	-1.00513E+02	0.00000E+00	8.93295E+00	0.00000E+00	-4.44420E+00	0.00000E+00
2.73333E+00	1.02371E+02	-1.01977E+02	0.00000E+00	8.96585E+00	0.00000E+00	-4.45977E+00	0.00000E+00
2.76667E+00	1.03832E+02	-1.03442E+02	0.00000E+00	8.99762E+00	0.00000E+00	-4.47469E+00	0.00000E+00
2.80000E+00	1.05294E+02	-1.04906E+02	0.00000E+00	9.02817E+00	0.00000E+00	-4.48895E+00	0.00000E+00
2.83333E+00	1.06756E+02	-1.06371E+02	0.00000E+00	9.05741E+00	0.00000E+00	-4.50257E+00	0.00000E+00
2.86667E+00	1.08218E+02	-1.07836E+02	0.00000E+00	9.08526E+00	0.00000E+00	-4.51554E+00	0.00000E+00
2.90000E+00	1.09680E+02	-1.09301E+02	0.00000E+00	9.11170E+00	0.00000E+00	-4.52789E+00	0.00000E+00
2.93333E+00	1.11142E+02	-1.10766E+02	0.00000E+00	9.13670E+00	0.00000E+00	-4.53966E+00	0.00000E+00
2.96667E+00	1.12604E+02	-1.12231E+02	0.00000E+00	9.16028E+00	0.00000E+00	-4.55088E+00	0.00000E+00
3.00000E+00	1.14066E+02	-1.13696E+02	0.00000E+00	9.18249E+00	0.00000E+00	-4.56161E+00	0.00000E+00
3.03333E+00	1.15528E+02	-1.15161E+02	0.00000E+00	9.20339E+00	0.00000E+00	-4.57188E+00	0.00000E+00
3.06667E+00	1.16990E+02	-1.16626E+02	0.00000E+00	9.22305E+00	0.00000E+00	-4.58178E+00	0.00000E+00
3.10000E+00	1.18453E+02	-1.18091E+02	0.00000E+00	9.24164E+00	0.00000E+00	-4.59134E+00	0.00000E+00
3.13333E+00	1.19914E+02	-1.19555E+02	0.00000E+00	9.27535E+00	0.00000E+00	-4.60852E+00	0.00000E+00
3.16667E+00	1.21360E+02	-1.20978E+02	0.00000E+00	9.62166E+00	0.00000E+00	-4.77788E+00	0.00000E+00
3.20000E+00	1.22803E+02	-1.22412E+02	0.00000E+00	9.79483E+00	0.00000E+00	-4.86097E+00	0.00000E+00
3.23333E+00	1.24247E+02	-1.23863E+02	0.00000E+00	9.76789E+00	0.00000E+00	-4.84616E+00	0.00000E+00
3.26667E+00	1.25689E+02	-1.25310E+02	0.00000E+00	9.74298E+00	0.00000E+00	-4.83327E+00	0.00000E+00
3.30000E+00	1.27125E+02	-1.26750E+02	0.00000E+00	9.75767E+00	0.00000E+00	-4.84055E+00	0.00000E+00
3.33333E+00	1.28514E+02	-1.28055E+02	0.00000E+00	1.08446E+01	0.00000E+00	-5.37012E+00	0.00000E+00
3.36667E+00	1.29785E+02	-1.28940E+02	0.00000E+00	1.47916E+01	0.00000E+00	-7.27837E+00	0.00000E+00
3.40000E+00	1.30981E+02	-1.29441E+02	0.00000E+00	2.00228E+01	0.00000E+00	-9.78089E+00	0.00000E+00
3.43333E+00	1.32168E+02	-1.30048E+02	0.00000E+00	2.35800E+01	0.00000E+00	-1.14361E+01	0.00000E+00
3.46667E+00	1.33366E+02	-1.30914E+02	0.00000E+00	2.54538E+01	0.00000E+00	-1.22519E+01	0.00000E+00
3.50000E+00	1.34567E+02	-1.31946E+02	0.00000E+00	2.64281E+01	0.00000E+00	-1.26246E+01	0.00000E+00
3.53333E+00	1.35765E+02	-1.33065E+02	0.00000E+00	2.69386E+01	0.00000E+00	-1.27760E+01	0.00000E+00
3.56667E+00	1.36958E+02	-1.34240E+02	0.00000E+00	2.71458E+01	0.00000E+00	-1.27851E+01	0.00000E+00
3.60000E+00	1.38144E+02	-1.35456E+02	0.00000E+00	2.71218E+01	0.00000E+00	-1.26854E+01	0.00000E+00
3.63333E+00	1.39326E+02	-1.36699E+02	0.00000E+00	2.69292E+01	0.00000E+00	-1.25072E+01	0.00000E+00
3.66667E+00	1.40501E+02	-1.37930E+02	0.00000E+00	2.67534E+01	0.00000E+00	-1.23501E+01	0.00000E+00
3.70000E+00	1.41663E+02	-1.39127E+02	0.00000E+00	2.66891E+01	0.00000E+00	-1.22678E+01	0.00000E+00
3.73333E+00	1.42814E+02	-1.40301E+02	0.00000E+00	2.66769E+01	0.00000E+00	-1.22306E+01	0.00000E+00
3.76667E+00	1.43954E+02	-1.41463E+02	0.00000E+00	2.66654E+01	0.00000E+00	-1.22127E+01	0.00000E+00
3.80000E+00	1.45084E+02	-1.42618E+02	0.00000E+00	2.66355E+01	0.00000E+00	-1.22026E+01	0.00000E+00
3.83333E+00	1.46205E+02	-1.43772E+02	0.00000E+00	2.65617E+01	0.00000E+00	-1.21882E+01	0.00000E+00
3.86667E+00	1.47323E+02	-1.44956E+02	0.00000E+00	2.63046E+01	0.00000E+00	-1.20921E+01	0.00000E+00

3.90000E+00	1.48446E+02	-1.46167E+02	0.00000E+00	2.59132E+01	0.00000E+00	-1.19369E+01	0.00000E+00
3.93333E+00	1.49565E+02	-1.47360E+02	0.00000E+00	2.55878E+01	0.00000E+00	-1.18305E+01	0.00000E+00
3.96667E+00	1.50677E+02	-1.48531E+02	0.00000E+00	2.53344E+01	0.00000E+00	-1.17790E+01	0.00000E+00
4.00000E+00	1.51782E+02	-1.49694E+02	0.00000E+00	2.50867E+01	0.00000E+00	-1.17479E+01	0.00000E+00
4.03333E+00	1.52885E+02	-1.50854E+02	0.00000E+00	2.48412E+01	0.00000E+00	-1.17260E+01	0.00000E+00
4.06667E+00	1.53991E+02	-1.52014E+02	0.00000E+00	2.45939E+01	0.00000E+00	-1.17003E+01	0.00000E+00
4.10000E+00	1.55101E+02	-1.53179E+02	0.00000E+00	2.43380E+01	0.00000E+00	-1.16646E+01	0.00000E+00
4.13333E+00	1.56214E+02	-1.54349E+02	0.00000E+00	2.40678E+01	0.00000E+00	-1.16160E+01	0.00000E+00
4.16667E+00	1.57332E+02	-1.55524E+02	0.00000E+00	2.37816E+01	0.00000E+00	-1.15532E+01	0.00000E+00
4.20000E+00	1.58454E+02	-1.56704E+02	0.00000E+00	2.34805E+01	0.00000E+00	-1.14767E+01	0.00000E+00
4.23333E+00	1.59580E+02	-1.57889E+02	0.00000E+00	2.31671E+01	0.00000E+00	-1.13876E+01	0.00000E+00
4.26667E+00	1.60710E+02	-1.59078E+02	0.00000E+00	2.28454E+01	0.00000E+00	-1.12878E+01	0.00000E+00
4.30000E+00	1.61844E+02	-1.60269E+02	0.00000E+00	2.25201E+01	0.00000E+00	-1.11796E+01	0.00000E+00
4.33333E+00	1.62981E+02	-1.61462E+02	0.00000E+00	2.21960E+01	0.00000E+00	-1.10653E+01	0.00000E+00
4.36667E+00	1.64121E+02	-1.62657E+02	0.00000E+00	2.18777E+01	0.00000E+00	-1.09473E+01	0.00000E+00
4.40000E+00	1.65265E+02	-1.63851E+02	0.00000E+00	2.15680E+01	0.00000E+00	-1.08272E+01	0.00000E+00
4.43333E+00	1.66410E+02	-1.65045E+02	0.00000E+00	2.12709E+01	0.00000E+00	-1.07071E+01	0.00000E+00
4.46667E+00	1.67588E+02	-1.66238E+02	0.00000E+00	2.09888E+01	0.00000E+00	-1.05886E+01	0.00000E+00
4.50000E+00	1.68707E+02	-1.67430E+02	0.00000E+00	2.07224E+01	0.00000E+00	-1.04725E+01	0.00000E+00
4.53333E+00	1.69858E+02	-1.68620E+02	0.00000E+00	2.04714E+01	0.00000E+00	-1.03592E+01	0.00000E+00
4.56667E+00	1.71010E+02	-1.69809E+02	0.00000E+00	2.02351E+01	0.00000E+00	-1.02488E+01	0.00000E+00
4.60000E+00	1.72163E+02	-1.70996E+02	0.00000E+00	2.00123E+01	0.00000E+00	-1.01413E+01	0.00000E+00
4.63333E+00	1.73317E+02	-1.72182E+02	0.00000E+00	1.98016E+01	0.00000E+00	-1.00366E+01	0.00000E+00
4.66667E+00	1.74472E+02	-1.73367E+02	0.00000E+00	1.96012E+01	0.00000E+00	-9.93443E+00	0.00000E+00
4.70000E+00	1.75627E+02	-1.74551E+02	0.00000E+00	1.94097E+01	0.00000E+00	-9.83448E+00	0.00000E+00
4.73333E+00	1.76782E+02	-1.75734E+02	0.00000E+00	1.92253E+01	0.00000E+00	-9.73648E+00	0.00000E+00
4.76667E+00	1.77938E+02	-1.76916E+02	0.00000E+00	1.90469E+01	0.00000E+00	-9.64022E+00	0.00000E+00
4.80000E+00	1.79094E+02	-1.78097E+02	0.00000E+00	1.88729E+01	0.00000E+00	-9.54549E+00	0.00000E+00
4.83333E+00	1.80250E+02	-1.79277E+02	0.00000E+00	1.87027E+01	0.00000E+00	-9.45216E+00	0.00000E+00
4.86667E+00	1.81406E+02	-1.80456E+02	0.00000E+00	1.85353E+01	0.00000E+00	-9.36013E+00	0.00000E+00
4.90000E+00	1.82562E+02	-1.81635E+02	0.00000E+00	1.83701E+01	0.00000E+00	-9.26932E+00	0.00000E+00
4.93333E+00	1.83718E+02	-1.82814E+02	0.00000E+00	1.82068E+01	0.00000E+00	-9.17968E+00	0.00000E+00
4.96667E+00	1.84874E+02	-1.83991E+02	0.00000E+00	1.80448E+01	0.00000E+00	-9.09120E+00	0.00000E+00
5.00000E+00	1.86030E+02	-1.85168E+02	0.00000E+00	1.78840E+01	0.00000E+00	-9.00387E+00	0.00000E+00
5.03333E+00	1.87186E+02	-1.86345E+02	0.00000E+00	1.77243E+01	0.00000E+00	-8.91769E+00	0.00000E+00
5.06667E+00	1.88341E+02	-1.87520E+02	0.00000E+00	1.75657E+01	0.00000E+00	-8.83269E+00	0.00000E+00
5.10000E+00	1.89497E+02	-1.88696E+02	0.00000E+00	1.74082E+01	0.00000E+00	-8.74889E+00	0.00000E+00
5.13333E+00	1.90652E+02	-1.89870E+02	0.00000E+00	1.72518E+01	0.00000E+00	-8.66631E+00	0.00000E+00
5.16667E+00	1.91808E+02	-1.91044E+02	0.00000E+00	1.70967E+01	0.00000E+00	-8.58500E+00	0.00000E+00
5.20000E+00	1.92963E+02	-1.92218E+02	0.00000E+00	1.69430E+01	0.00000E+00	-8.50497E+00	0.00000E+00
5.23333E+00	1.94118E+02	-1.93391E+02	0.00000E+00	1.67909E+01	0.00000E+00	-8.42626E+00	0.00000E+00
5.26667E+00	1.95273E+02	-1.94563E+02	0.00000E+00	1.66405E+01	0.00000E+00	-8.34891E+00	0.00000E+00
5.30000E+00	1.96428E+02	-1.95734E+02	0.00000E+00	1.64921E+01	0.00000E+00	-8.27292E+00	0.00000E+00
5.33333E+00	1.97583E+02	-1.96906E+02	0.00000E+00	1.63458E+01	0.00000E+00	-8.19834E+00	0.00000E+00
5.36667E+00	1.98738E+02	-1.98076E+02	0.00000E+00	1.62017E+01	0.00000E+00	-8.12517E+00	0.00000E+00
5.40000E+00	1.99893E+02	-1.99246E+02	0.00000E+00	1.60600E+01	0.00000E+00	-8.05344E+00	0.00000E+00
5.43333E+00	2.01047E+02	-2.00415E+02	0.00000E+00	1.59208E+01	0.00000E+00	-7.98315E+00	0.00000E+00
5.46667E+00	2.02201E+02	-2.01584E+02	0.00000E+00	1.57842E+01	0.00000E+00	-7.91432E+00	0.00000E+00
5.50000E+00	2.03355E+02	-2.02752E+02	0.00000E+00	1.56504E+01	0.00000E+00	-7.84694E+00	0.00000E+00
5.53333E+00	2.04510E+02	-2.03920E+02	0.00000E+00	1.55193E+01	0.00000E+00	-7.78102E+00	0.00000E+00
5.56667E+00	2.05664E+02	-2.05087E+02	0.00000E+00	1.53911E+01	0.00000E+00	-7.71655E+00	0.00000E+00
5.60000E+00	2.06818E+02	-2.06254E+02	0.00000E+00	1.52657E+01	0.00000E+00	-7.65351E+00	0.00000E+00
5.63333E+00	2.07972E+02	-2.07420E+02	0.00000E+00	1.51432E+01	0.00000E+00	-7.59190E+00	0.00000E+00
5.66667E+00	2.09126E+02	-2.08586E+02	0.00000E+00	1.50235E+01	0.00000E+00	-7.53170E+00	0.00000E+00

## boat30.out

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Time	Fm	Fx	Fy	Fz	Tqm	Tqx	Tqy	Tqz
5.70000E+00	2.10280E+02	-2.09751E+02	0.00000E+00	1.49067E+01	0.00000E+00	-7.47287E+00	0.00000E+00	0.00000E+00
5.73333E+00	2.11434E+02	-2.10916E+02	0.00000E+00	1.47926E+01	0.00000E+00	-7.41541E+00	0.00000E+00	0.00000E+00
5.76667E+00	2.12588E+02	-2.12080E+02	0.00000E+00	1.46814E+01	0.00000E+00	-7.35929E+00	0.00000E+00	0.00000E+00
5.80000E+00	2.13742E+02	-2.13244E+02	0.00000E+00	1.45728E+01	0.00000E+00	-7.30446E+00	0.00000E+00	0.00000E+00
5.83333E+00	2.14895E+02	-2.14408E+02	0.00000E+00	1.44669E+01	0.00000E+00	-7.25092E+00	0.00000E+00	0.00000E+00
5.86667E+00	2.16049E+02	-2.15571E+02	0.00000E+00	1.43636E+01	0.00000E+00	-7.19863E+00	0.00000E+00	0.00000E+00
5.90000E+00	2.17202E+02	-2.16734E+02	0.00000E+00	1.42628E+01	0.00000E+00	-7.14755E+00	0.00000E+00	0.00000E+00
5.93333E+00	2.18356E+02	-2.17896E+02	0.00000E+00	1.41644E+01	0.00000E+00	-7.09767E+00	0.00000E+00	0.00000E+00
5.96667E+00	2.19509E+02	-2.19058E+02	0.00000E+00	1.40684E+01	0.00000E+00	-7.04894E+00	0.00000E+00	0.00000E+00
6.00000E+00	2.20663E+02	-2.20220E+02	0.00000E+00	1.39747E+01	0.00000E+00	-7.00135E+00	0.00000E+00	0.00000E+00
1Boat 30 mph								
Request Number 2103								
Force exerted on Marker 200100 by Marker 1002103								
0.00000E+00	9.78877E+02	0.00000E+00	0.00000E+00	9.78877E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E-02	9.77597E+02	0.00000E+00	0.00000E+00	9.77597E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.66667E-02	9.74585E+02	0.00000E+00	0.00000E+00	9.74585E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.00000E-01	9.70635E+02	0.00000E+00	0.00000E+00	9.70635E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.33333E-01	9.66282E+02	0.00000E+00	0.00000E+00	9.66282E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.66667E-01	9.58393E+02	0.00000E+00	0.00000E+00	9.58393E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.00000E-01	9.50565E+02	0.00000E+00	0.00000E+00	9.50565E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.33333E-01	9.43194E+02	0.00000E+00	0.00000E+00	9.43194E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.66667E-01	9.36409E+02	0.00000E+00	0.00000E+00	9.36409E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.00000E-01	9.30258E+02	0.00000E+00	0.00000E+00	9.30258E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E-01	9.24753E+02	0.00000E+00	0.00000E+00	9.24753E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.66667E-01	9.19868E+02	0.00000E+00	0.00000E+00	9.19868E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.00000E-01	9.15573E+02	0.00000E+00	0.00000E+00	9.15573E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.33333E-01	9.11824E+02	0.00000E+00	0.00000E+00	9.11824E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.66667E-01	9.08567E+02	0.00000E+00	0.00000E+00	9.08567E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.00000E-01	9.05754E+02	0.00000E+00	0.00000E+00	9.05754E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.33333E-01	9.03325E+02	0.00000E+00	0.00000E+00	9.03325E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.66667E-01	9.01223E+02	0.00000E+00	0.00000E+00	9.01223E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.00000E-01	8.99392E+02	0.00000E+00	0.00000E+00	8.99392E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.33333E-01	8.97780E+02	0.00000E+00	0.00000E+00	8.97780E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.66667E-01	8.96344E+02	0.00000E+00	0.00000E+00	8.96344E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
7.00000E-01	8.95041E+02	0.00000E+00	0.00000E+00	8.95041E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
7.33333E-01	8.93838E+02	0.00000E+00	0.00000E+00	8.93838E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
7.66667E-01	8.92706E+02	0.00000E+00	0.00000E+00	8.92706E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
8.00000E-01	8.91619E+02	0.00000E+00	0.00000E+00	8.91619E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
8.33333E-01	8.90559E+02	0.00000E+00	0.00000E+00	8.90559E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
8.66667E-01	8.89511E+02	0.00000E+00	0.00000E+00	8.89511E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9.00000E-01	8.88464E+02	0.00000E+00	0.00000E+00	8.88464E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9.33333E-01	8.87411E+02	0.00000E+00	0.00000E+00	8.87411E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9.66667E-01	8.86349E+02	0.00000E+00	0.00000E+00	8.86349E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.00000E+00	8.85276E+02	0.00000E+00	0.00000E+00	8.85276E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.03333E+00	8.84216E+02	0.00000E+00	0.00000E+00	8.84216E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.06667E+00	8.83211E+02	0.00000E+00	0.00000E+00	8.83211E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.10000E+00	8.82287E+02	0.00000E+00	0.00000E+00	8.82287E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.13333E+00	8.81441E+02	0.00000E+00	0.00000E+00	8.81441E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.16667E+00	8.80653E+02	0.00000E+00	0.00000E+00	8.80653E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.20000E+00	8.79899E+02	0.00000E+00	0.00000E+00	8.79899E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.23333E+00	8.79160E+02	0.00000E+00	0.00000E+00	8.79160E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.26667E+00	8.78418E+02	0.00000E+00	0.00000E+00	8.78418E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

[illegible]

3.10000E+00	8.34577E+02	0.00000E+00	0.00000E+00	8.34577E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.13333E+00	8.33972E+02	0.00000E+00	0.00000E+00	8.33972E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.16667E+00	8.24470E+02	0.00000E+00	0.00000E+00	8.24470E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.20000E+00	8.19048E+02	0.00000E+00	0.00000E+00	8.19048E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.23333E+00	8.19003E+02	0.00000E+00	0.00000E+00	8.19003E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.26667E+00	8.19337E+02	0.00000E+00	0.00000E+00	8.19337E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.30000E+00	8.18987E+02	0.00000E+00	0.00000E+00	8.18987E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E+00	7.89945E+02	0.00000E+00	0.00000E+00	7.89945E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.36667E+00	6.50881E+02	0.00000E+00	0.00000E+00	6.50881E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.40000E+00	4.20317E+02	0.00000E+00	0.00000E+00	4.20317E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.43333E+00	3.01569E+02	0.00000E+00	0.00000E+00	3.01569E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.46667E+00	2.31034E+02	0.00000E+00	0.00000E+00	2.31034E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.50000E+00	1.79460E+02	0.00000E+00	0.00000E+00	1.79460E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.53333E+00	1.38422E+02	0.00000E+00	0.00000E+00	1.38422E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.56667E+00	1.03808E+02	0.00000E+00	0.00000E+00	1.03808E+02	0.00000E+00	0.00000E+00	0.00000E+00
3.60000E+00	7.28674E+01	0.00000E+00	0.00000E+00	7.28674E+01	0.00000E+00	0.00000E+00	0.00000E+00
3.63333E+00	4.42241E+01	0.00000E+00	0.00000E+00	4.42241E+01	0.00000E+00	0.00000E+00	0.00000E+00
3.66667E+00	2.03187E+01	0.00000E+00	0.00000E+00	2.03187E+01	0.00000E+00	0.00000E+00	0.00000E+00
3.70000E+00	3.92213E+00	0.00000E+00	0.00000E+00	3.92213E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.73333E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.76667E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.80000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.83333E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.86667E+00	7.96762E+00	0.00000E+00	0.00000E+00	7.96762E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.90000E+00	2.03907E+01	0.00000E+00	0.00000E+00	2.03907E+01	0.00000E+00	0.00000E+00	0.00000E+00
3.93333E+00	3.95670E+01	0.00000E+00	0.00000E+00	3.95670E+01	0.00000E+00	0.00000E+00	0.00000E+00
3.96667E+00	6.68439E+01	0.00000E+00	0.00000E+00	6.68439E+01	0.00000E+00	0.00000E+00	0.00000E+00
4.00000E+00	1.02173E+02	0.00000E+00	0.00000E+00	1.02173E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.03333E+00	1.42414E+02	0.00000E+00	0.00000E+00	1.42414E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.06667E+00	1.83631E+02	0.00000E+00	0.00000E+00	1.83631E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.10000E+00	2.24955E+02	0.00000E+00	0.00000E+00	2.24955E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.13333E+00	2.66306E+02	0.00000E+00	0.00000E+00	2.66306E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.16667E+00	3.07651E+02	0.00000E+00	0.00000E+00	3.07651E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.20000E+00	3.48888E+02	0.00000E+00	0.00000E+00	3.48888E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.23333E+00	3.89808E+02	0.00000E+00	0.00000E+00	3.89808E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.26667E+00	4.30101E+02	0.00000E+00	0.00000E+00	4.30101E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.30000E+00	4.69355E+02	0.00000E+00	0.00000E+00	4.69355E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.33333E+00	5.07094E+02	0.00000E+00	0.00000E+00	5.07094E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.36667E+00	5.42802E+02	0.00000E+00	0.00000E+00	5.42802E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.40000E+00	5.75972E+02	0.00000E+00	0.00000E+00	5.75972E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.43333E+00	6.03815E+02	0.00000E+00	0.00000E+00	6.03815E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.46667E+00	6.23667E+02	0.00000E+00	0.00000E+00	6.23667E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.50000E+00	6.40604E+02	0.00000E+00	0.00000E+00	6.40604E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.53333E+00	6.54663E+02	0.00000E+00	0.00000E+00	6.54663E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.56667E+00	6.65978E+02	0.00000E+00	0.00000E+00	6.65978E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.60000E+00	6.74761E+02	0.00000E+00	0.00000E+00	6.74761E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.63333E+00	6.79943E+02	0.00000E+00	0.00000E+00	6.79943E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.66667E+00	6.83333E+02	0.00000E+00	0.00000E+00	6.83333E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.70000E+00	6.85511E+02	0.00000E+00	0.00000E+00	6.85511E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.73333E+00	6.86730E+02	0.00000E+00	0.00000E+00	6.86730E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.76667E+00	6.87230E+02	0.00000E+00	0.00000E+00	6.87230E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.80000E+00	6.87226E+02	0.00000E+00	0.00000E+00	6.87226E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.83333E+00	6.86918E+02	0.00000E+00	0.00000E+00	6.86918E+02	0.00000E+00	0.00000E+00	0.00000E+00
4.86667E+00	6.86461E+02	0.00000E+00	0.00000E+00	6.86461E+02	0.00000E+00	0.00000E+00	0.00000E+00

boat30.out

Thu Oct 31 12:22:24 1991

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Time	Fm	Fx	Fy	Fz	Tqm	Tqx	Tqy	Tqz
4.90000E+00	6.85990E+02	0.00000E+00	0.00000E+00	6.85990E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.93333E+00	6.85613E+02	0.00000E+00	0.00000E+00	6.85613E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.96667E+00	6.85415E+02	0.00000E+00	0.00000E+00	6.85415E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.00000E+00	6.85457E+02	0.00000E+00	0.00000E+00	6.85457E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.03333E+00	6.85780E+02	0.00000E+00	0.00000E+00	6.85780E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.06667E+00	6.86410E+02	0.00000E+00	0.00000E+00	6.86410E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.10000E+00	6.87354E+02	0.00000E+00	0.00000E+00	6.87354E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.13333E+00	6.88611E+02	0.00000E+00	0.00000E+00	6.88611E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.16667E+00	6.90170E+02	0.00000E+00	0.00000E+00	6.90170E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.20000E+00	6.92010E+02	0.00000E+00	0.00000E+00	6.92010E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.23333E+00	6.94108E+02	0.00000E+00	0.00000E+00	6.94108E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.26667E+00	6.96434E+02	0.00000E+00	0.00000E+00	6.96434E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.30000E+00	6.98956E+02	0.00000E+00	0.00000E+00	6.98956E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.33333E+00	7.01642E+02	0.00000E+00	0.00000E+00	7.01642E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.36667E+00	7.04462E+02	0.00000E+00	0.00000E+00	7.04462E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.40000E+00	7.07383E+02	0.00000E+00	0.00000E+00	7.07383E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.43333E+00	7.10375E+02	0.00000E+00	0.00000E+00	7.10375E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.46667E+00	7.13411E+02	0.00000E+00	0.00000E+00	7.13411E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.50000E+00	7.16465E+02	0.00000E+00	0.00000E+00	7.16465E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.53333E+00	7.19516E+02	0.00000E+00	0.00000E+00	7.19516E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.56667E+00	7.22544E+02	0.00000E+00	0.00000E+00	7.22544E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.60000E+00	7.25533E+02	0.00000E+00	0.00000E+00	7.25533E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.63333E+00	7.28469E+02	0.00000E+00	0.00000E+00	7.28469E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.66667E+00	7.31344E+02	0.00000E+00	0.00000E+00	7.31344E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.70000E+00	7.34148E+02	0.00000E+00	0.00000E+00	7.34148E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.73333E+00	7.36877E+02	0.00000E+00	0.00000E+00	7.36877E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.76667E+00	7.39528E+02	0.00000E+00	0.00000E+00	7.39528E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.80000E+00	7.42099E+02	0.00000E+00	0.00000E+00	7.42099E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.83333E+00	7.44592E+02	0.00000E+00	0.00000E+00	7.44592E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.86667E+00	7.47007E+02	0.00000E+00	0.00000E+00	7.47007E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.90000E+00	7.49348E+02	0.00000E+00	0.00000E+00	7.49348E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.93333E+00	7.51618E+02	0.00000E+00	0.00000E+00	7.51618E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.96667E+00	7.53821E+02	0.00000E+00	0.00000E+00	7.53821E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.00000E+00	7.55962E+02	0.00000E+00	0.00000E+00	7.55962E+02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

1Boat 30 mph  
Request Number 2105

Force exerted on Marker 200100 by Marker 1002102

Time	Fm	Fx	Fy	Fz	Tqm	Tqx	Tqy	Tqz
0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.84429E+03	0.00000E+00	3.84429E+03	0.00000E+00
3.33333E-02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.83415E+03	0.00000E+00	3.83415E+03	0.00000E+00
6.66667E-02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.81031E+03	0.00000E+00	3.81031E+03	0.00000E+00
1.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.77909E+03	0.00000E+00	3.77909E+03	0.00000E+00
3.33333E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.74460E+03	0.00000E+00	3.74460E+03	0.00000E+00
1.66667E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.68270E+03	0.00000E+00	3.68270E+03	0.00000E+00
2.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.62136E+03	0.00000E+00	3.62136E+03	0.00000E+00
2.33333E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.56380E+03	0.00000E+00	3.56380E+03	0.00000E+00
2.66667E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.51100E+03	0.00000E+00	3.51100E+03	0.00000E+00
3.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.46329E+03	0.00000E+00	3.46329E+03	0.00000E+00
3.33333E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.42070E+03	0.00000E+00	3.42070E+03	0.00000E+00
3.66667E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.38302E+03	0.00000E+00	3.38302E+03	0.00000E+00
4.00000E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.34996E+03	0.00000E+00	3.34996E+03	0.00000E+00
4.33333E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.32116E+03	0.00000E+00	3.32116E+03	0.00000E+00
4.66667E-01	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.29620E+03	0.00000E+00	3.29620E+03	0.00000E+00





**boat30.out**

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5.90000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 2.13164E+03 0.00000E+00 2.13164E+03 0.00000E+00  
5.93333E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 2.14739E+03 0.00000E+00 2.14739E+03 0.00000E+00  
5.96667E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 2.16271E+03 0.00000E+00 2.16271E+03 0.00000E+00  
6.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 2.17762E+03 0.00000E+00 2.17762E+03 0.00000E+00

1Boat 30 mph

Request Number

3001

Target Boat Displacement

Displacement of Marker 300100 relative to Marker 1003001

Time	Mag	X	Y	Z	Yaw	Pitch	Roll
0.00000E+00	2.00141E+01	-2.00000E+01	0.00000E+00	7.50000E-01	9.00000E+01	0.00000E+00	0.00000E+00
3.33333E-02	2.00141E+01	-2.00000E+01	0.00000E+00	7.49972E-01	9.00000E+01	0.00000E+00	0.00000E+00
6.66667E-02	2.00141E+01	-2.00000E+01	0.00000E+00	7.49896E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.00000E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.49785E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.33333E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.49648E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.66667E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.49497E-01	9.00000E+01	0.00000E+00	0.00000E+00
2.00000E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.49337E-01	9.00000E+01	0.00000E+00	0.00000E+00
2.33333E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.49179E-01	9.00000E+01	0.00000E+00	0.00000E+00
2.66667E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.49027E-01	9.00000E+01	0.00000E+00	0.00000E+00
3.00000E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48886E-01	9.00000E+01	0.00000E+00	0.00000E+00
3.33333E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48759E-01	9.00000E+01	0.00000E+00	0.00000E+00
3.66667E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48647E-01	9.00000E+01	0.00000E+00	0.00000E+00
4.00000E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48552E-01	9.00000E+01	0.00000E+00	0.00000E+00
4.33333E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48474E-01	9.00000E+01	0.00000E+00	0.00000E+00
4.66667E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48412E-01	9.00000E+01	0.00000E+00	0.00000E+00
5.00000E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48365E-01	9.00000E+01	0.00000E+00	0.00000E+00
5.33333E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48332E-01	9.00000E+01	0.00000E+00	0.00000E+00
5.66667E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48312E-01	9.00000E+01	0.00000E+00	0.00000E+00
6.00000E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48302E-01	9.00000E+01	0.00000E+00	0.00000E+00
6.33333E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48301E-01	9.00000E+01	0.00000E+00	0.00000E+00
6.66667E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48308E-01	9.00000E+01	0.00000E+00	0.00000E+00
7.00000E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48320E-01	9.00000E+01	0.00000E+00	0.00000E+00
7.33333E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48336E-01	9.00000E+01	0.00000E+00	0.00000E+00
7.66667E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48355E-01	9.00000E+01	0.00000E+00	0.00000E+00
8.00000E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48375E-01	9.00000E+01	0.00000E+00	0.00000E+00
8.33333E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48395E-01	9.00000E+01	0.00000E+00	0.00000E+00
8.66667E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48415E-01	9.00000E+01	0.00000E+00	0.00000E+00
9.00000E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48434E-01	9.00000E+01	0.00000E+00	0.00000E+00
9.33333E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48452E-01	9.00000E+01	0.00000E+00	0.00000E+00
9.66667E-01	2.00140E+01	-2.00000E+01	0.00000E+00	7.48467E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.00000E+00	2.00140E+01	-2.00000E+01	0.00000E+00	7.48481E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.03333E+00	2.00140E+01	-2.00000E+01	0.00000E+00	7.48492E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.06667E+00	2.00140E+01	-2.00000E+01	0.00000E+00	7.48501E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.10000E+00	2.00140E+01	-2.00000E+01	0.00000E+00	7.48508E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.13333E+00	2.00140E+01	-2.00000E+01	0.00000E+00	7.48514E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.16667E+00	2.00140E+01	-2.00000E+01	0.00000E+00	7.48517E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.20000E+00	2.00140E+01	-2.00000E+01	0.00000E+00	7.48519E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.23333E+00	2.00140E+01	-2.00000E+01	0.00000E+00	7.48520E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.26667E+00	2.00140E+01	-2.00000E+01	0.00000E+00	7.48520E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.30000E+00	2.00140E+01	-2.00000E+01	0.00000E+00	7.48518E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.33333E+00	2.00140E+01	-2.00000E+01	0.00000E+00	7.48517E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.36667E+00	2.00140E+01	-2.00000E+01	0.00000E+00	7.48514E-01	9.00000E+01	0.00000E+00	0.00000E+00
1.40000E+00	2.00140E+01	-2.00000E+01	0.00000E+00	7.48512E-01	9.00000E+01	0.00000E+00	0.00000E+00

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3.23333E+00	2.00697E+01	-2.00563E+01	0.00000E+00	7.31742E-01	9.00000E+01	0.00000E+00	1.36625E-01
3.26667E+00	2.00902E+01	-2.00769E+01	0.00000E+00	7.31392E-01	9.00000E+01	0.00000E+00	1.47804E-01
3.30000E+00	2.01153E+01	-2.01020E+01	0.00000E+00	7.31126E-01	9.00000E+01	0.00000E+00	1.39628E-01
3.33333E+00	2.01870E+01	-2.01747E+01	0.00000E+00	7.03442E-01	9.00000E+01	0.00000E+00	-6.68982E-01
3.36667E+00	2.03620E+01	-2.03539E+01	0.00000E+00	5.77114E-01	9.00000E+01	0.00000E+00	-3.93785E+00
3.40000E+00	2.05900E+01	-2.05868E+01	0.00000E+00	3.64039E-01	9.00000E+01	0.00000E+00	-9.20877E+00
3.43333E+00	2.08214E+01	-2.08207E+01	0.00000E+00	1.69623E-01	9.00000E+01	0.00000E+00	-1.42268E+01
3.46667E+00	2.10434E+01	-2.10434E+01	0.00000E+00	3.38453E-02	9.00000E+01	0.00000E+00	-1.82232E+01
3.50000E+00	2.12557E+01	-2.12557E+01	0.00000E+00	-4.64369E-02	9.00000E+01	0.00000E+00	-2.13031E+01
3.53333E+00	2.14590E+01	-2.14589E+01	0.00000E+00	-7.93280E-02	9.00000E+01	0.00000E+00	-2.35860E+01
3.56667E+00	2.16553E+01	-2.16552E+01	0.00000E+00	-7.80485E-01	9.00000E+01	0.00000E+00	-2.50946E+01
3.60000E+00	2.18466E+01	-2.18465E+01	0.00000E+00	-5.70535E-02	9.00000E+01	0.00000E+00	-2.58373E+01
3.63333E+00	2.20325E+01	-2.20325E+01	0.00000E+00	-2.59742E-02	9.00000E+01	0.00000E+00	-2.58808E+01
3.66667E+00	2.22110E+01	-2.22110E+01	0.00000E+00	2.12294E-02	9.00000E+01	0.00000E+00	-2.55270E+01
3.70000E+00	2.23835E+01	-2.23834E+01	0.00000E+00	8.87112E-02	9.00000E+01	0.00000E+00	-2.50238E+01
3.73333E+00	2.25514E+01	-2.25507E+01	0.00000E+00	1.71023E-01	9.00000E+01	0.00000E+00	-2.44275E+01
3.76667E+00	2.27151E+01	-2.27136E+01	0.00000E+00	2.61354E-01	9.00000E+01	0.00000E+00	-2.37537E+01
3.80000E+00	2.28751E+01	-2.28724E+01	0.00000E+00	3.54204E-01	9.00000E+01	0.00000E+00	-2.30258E+01
3.83333E+00	2.30318E+01	-2.30275E+01	0.00000E+00	4.44048E-01	9.00000E+01	0.00000E+00	-2.22902E+01
3.86667E+00	2.31843E+01	-2.31786E+01	0.00000E+00	5.17225E-01	9.00000E+01	0.00000E+00	-2.17796E+01
3.90000E+00	2.33270E+01	-2.33200E+01	0.00000E+00	5.70233E-01	9.00000E+01	0.00000E+00	-2.15434E+01
3.93333E+00	2.34612E+01	-2.34531E+01	0.00000E+00	6.15823E-01	9.00000E+01	0.00000E+00	-2.13077E+01
3.96667E+00	2.35903E+01	-2.35811E+01	0.00000E+00	6.58857E-01	9.00000E+01	0.00000E+00	-2.09686E+01
4.00000E+00	2.37148E+01	-2.37045E+01	0.00000E+00	6.97986E-01	9.00000E+01	0.00000E+00	-2.05566E+01
4.03333E+00	2.38348E+01	-2.38236E+01	0.00000E+00	7.32597E-01	9.00000E+01	0.00000E+00	-2.00877E+01
4.06667E+00	2.39507E+01	-2.39386E+01	0.00000E+00	7.62039E-01	9.00000E+01	0.00000E+00	-1.95825E+01
4.10000E+00	2.40626E+01	-2.40497E+01	0.00000E+00	7.86168E-01	9.00000E+01	0.00000E+00	-1.90534E+01
4.13333E+00	2.41708E+01	-2.41574E+01	0.00000E+00	8.05087E-01	9.00000E+01	0.00000E+00	-1.85091E+01
4.16667E+00	2.42755E+01	-2.42617E+01	0.00000E+00	8.19135E-01	9.00000E+01	0.00000E+00	-1.79571E+01
4.20000E+00	2.43769E+01	-2.43628E+01	0.00000E+00	8.28682E-01	9.00000E+01	0.00000E+00	-1.74018E+01
4.23333E+00	2.44753E+01	-2.44610E+01	0.00000E+00	8.34184E-01	9.00000E+01	0.00000E+00	-1.68468E+01
4.26667E+00	2.45707E+01	-2.45565E+01	0.00000E+00	8.36151E-01	9.00000E+01	0.00000E+00	-1.62949E+01
4.30000E+00	2.46634E+01	-2.46492E+01	0.00000E+00	8.35120E-01	9.00000E+01	0.00000E+00	-1.57485E+01
4.33333E+00	2.47535E+01	-2.47395E+01	0.00000E+00	8.31631E-01	9.00000E+01	0.00000E+00	-1.52092E+01
4.36667E+00	2.48411E+01	-2.48274E+01	0.00000E+00	8.26216E-01	9.00000E+01	0.00000E+00	-1.46785E+01
4.40000E+00	2.49265E+01	-2.49130E+01	0.00000E+00	8.19235E-01	9.00000E+01	0.00000E+00	-1.41570E+01
4.43333E+00	2.50096E+01	-2.49965E+01	0.00000E+00	8.11264E-01	9.00000E+01	0.00000E+00	-1.36461E+01
4.46667E+00	2.50908E+01	-2.50779E+01	0.00000E+00	8.02798E-01	9.00000E+01	0.00000E+00	-1.31467E+01
4.50000E+00	2.51700E+01	-2.51575E+01	0.00000E+00	7.94222E-01	9.00000E+01	0.00000E+00	-1.26595E+01
4.53333E+00	2.52474E+01	-2.52351E+01	0.00000E+00	7.85845E-01	9.00000E+01	0.00000E+00	-1.21852E+01
4.56667E+00	2.53230E+01	-2.53111E+01	0.00000E+00	7.77912E-01	9.00000E+01	0.00000E+00	-1.17243E+01
4.60000E+00	2.53970E+01	-2.53853E+01	0.00000E+00	7.70611E-01	9.00000E+01	0.00000E+00	-1.12771E+01
4.63333E+00	2.54694E+01	-2.54580E+01	0.00000E+00	7.64071E-01	9.00000E+01	0.00000E+00	-1.08439E+01
4.66667E+00	2.55403E+01	-2.55291E+01	0.00000E+00	7.58370E-01	9.00000E+01	0.00000E+00	-1.04247E+01
4.70000E+00	2.56098E+01	-2.55987E+01	0.00000E+00	7.53540E-01	9.00000E+01	0.00000E+00	-1.00195E+01
4.73333E+00	2.56779E+01	-2.56669E+01	0.00000E+00	7.49578E-01	9.00000E+01	0.00000E+00	-9.62831E+00
4.76667E+00	2.57466E+01	-2.57338E+01	0.00000E+00	7.46447E-01	9.00000E+01	0.00000E+00	-9.25086E+00
4.80000E+00	2.58101E+01	-2.57993E+01	0.00000E+00	7.44091E-01	9.00000E+01	0.00000E+00	-8.88697E+00
4.83333E+00	2.58743E+01	-2.58636E+01	0.00000E+00	7.42439E-01	9.00000E+01	0.00000E+00	-8.53638E+00
4.86667E+00	2.59373E+01	-2.59267E+01	0.00000E+00	7.41402E-01	9.00000E+01	0.00000E+00	-8.19879E+00
4.90000E+00	2.59992E+01	-2.59886E+01	0.00000E+00	7.40890E-01	9.00000E+01	0.00000E+00	-7.87387E+00
4.93333E+00	2.60600E+01	-2.60494E+01	0.00000E+00	7.40813E-01	9.00000E+01	0.00000E+00	-7.56129E+00
4.96667E+00	2.61197E+01	-2.61092E+01	0.00000E+00	7.41085E-01	9.00000E+01	0.00000E+00	-7.26069E+00
5.00000E+00	2.61783E+01	-2.61678E+01	0.00000E+00	7.41621E-01	9.00000E+01	0.00000E+00	-6.97170E+00

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Time	Velocity	of Marker	300100	relative to Marker	1003001	Vm	Vx	Vy	Vz	Wm	Wx	Wy	Wz
0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E-02	1.63713E-03	0.00000E+00	0.00000E+00	0.00000E+00	-1.63713E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.66667E-02	2.89394E-03	0.00000E+00	0.00000E+00	0.00000E+00	-2.89394E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.00000E-01	3.79846E-03	0.00000E+00	0.00000E+00	0.00000E+00	-3.79846E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.33333E-01	4.38707E-03	0.00000E+00	0.00000E+00	0.00000E+00	-4.38707E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.66667E-01	4.69917E-03	0.00000E+00	0.00000E+00	0.00000E+00	-4.69917E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.00000E-01	4.77438E-03	0.00000E+00	0.00000E+00	0.00000E+00	-4.77438E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.33333E-01	4.66026E-03	0.00000E+00	0.00000E+00	0.00000E+00	-4.66026E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.66667E-01	4.39913E-03	0.00000E+00	0.00000E+00	0.00000E+00	-4.39913E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.00000E-01	4.02940E-03	0.00000E+00	0.00000E+00	0.00000E+00	-4.02940E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E-01	3.58681E-03	0.00000E+00	0.00000E+00	0.00000E+00	-3.58681E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.66667E-01	3.10130E-03	0.00000E+00	0.00000E+00	0.00000E+00	-3.10130E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.00000E-01	2.60023E-03	0.00000E+00	0.00000E+00	0.00000E+00	-2.60023E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.33333E-01	2.10375E-03	0.00000E+00	0.00000E+00	0.00000E+00	-2.10375E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.66667E-01	1.62863E-03	0.00000E+00	0.00000E+00	0.00000E+00	-1.62863E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.00000E-01	1.18748E-03	0.00000E+00	0.00000E+00	0.00000E+00	-1.18748E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.33333E-01	7.88838E-04	0.00000E+00	0.00000E+00	0.00000E+00	-7.88838E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

1Boat 30 mph  
Request Number 3002

Target Boat Velocity

Velocity of Marker 300100 relative to Marker 1003001

5.66667E-01	4.40263E-04	0.00000E+00	0.00000E+00	-4.40263E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.00000E-01	1.44955E-04	0.00000E+00	0.00000E+00	-1.44955E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.33333E-01	9.68517E-05	0.00000E+00	0.00000E+00	9.68517E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.66667E-01	2.87132E-04	0.00000E+00	0.00000E+00	2.87132E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
7.00000E-01	4.28904E-04	0.00000E+00	0.00000E+00	4.28904E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
7.33333E-01	5.26972E-04	0.00000E+00	0.00000E+00	5.26972E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
7.66667E-01	5.86481E-04	0.00000E+00	0.00000E+00	5.86481E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
8.00000E-01	6.12849E-04	0.00000E+00	0.00000E+00	6.12849E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
8.33333E-01	6.11691E-04	0.00000E+00	0.00000E+00	6.11691E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
8.66667E-01	5.88505E-04	0.00000E+00	0.00000E+00	5.88505E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9.00000E-01	5.48452E-04	0.00000E+00	0.00000E+00	5.48452E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9.33333E-01	4.96306E-04	0.00000E+00	0.00000E+00	4.96306E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9.66667E-01	4.36451E-04	0.00000E+00	0.00000E+00	4.36451E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.00000E+00	3.72641E-04	0.00000E+00	0.00000E+00	3.72641E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.03333E+00	3.07916E-04	0.00000E+00	0.00000E+00	3.07916E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.06667E+00	2.44824E-04	0.00000E+00	0.00000E+00	2.44824E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.10000E+00	1.85282E-04	0.00000E+00	0.00000E+00	1.85282E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.13333E+00	1.30771E-04	0.00000E+00	0.00000E+00	1.30771E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.16667E+00	8.22595E-05	0.00000E+00	0.00000E+00	8.22595E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.20000E+00	4.03614E-05	0.00000E+00	0.00000E+00	4.03614E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.23333E+00	5.27084E-06	0.00000E+00	0.00000E+00	5.27084E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.26667E+00	3.1248E-05	0.00000E+00	0.00000E+00	-2.31248E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.30000E+00	4.50291E-05	0.00000E+00	0.00000E+00	4.50291E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.33333E+00	6.09860E-05	0.00000E+00	0.00000E+00	-6.09860E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.36667E+00	7.15454E-05	0.00000E+00	0.00000E+00	-7.15454E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.40000E+00	7.73040E-05	0.00000E+00	0.00000E+00	-7.73040E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.43333E+00	7.90398E-05	0.00000E+00	0.00000E+00	-7.90398E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.46667E+00	7.77004E-05	0.00000E+00	0.00000E+00	-7.77004E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.50000E+00	7.38000E-05	0.00000E+00	0.00000E+00	-7.38000E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.53333E+00	6.79961E-05	0.00000E+00	0.00000E+00	-6.79961E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.56667E+00	6.08688E-05	0.00000E+00	0.00000E+00	-6.08688E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.60000E+00	5.29065E-05	0.00000E+00	0.00000E+00	-5.29065E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.63333E+00	4.46005E-05	0.00000E+00	0.00000E+00	-4.46005E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.66667E+00	3.63422E-05	0.00000E+00	0.00000E+00	-3.63422E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.70000E+00	2.83772E-05	0.00000E+00	0.00000E+00	-2.83772E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.73333E+00	2.09173E-05	0.00000E+00	0.00000E+00	-2.09173E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.76667E+00	1.41426E-05	0.00000E+00	0.00000E+00	-1.41426E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.80000E+00	8.16652E-06	0.00000E+00	0.00000E+00	-8.16652E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.83333E+00	3.05964E-06	0.00000E+00	0.00000E+00	-3.05964E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.86667E+00	1.08166E-06	0.00000E+00	0.00000E+00	1.08166E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.90000E+00	4.29726E-06	0.00000E+00	0.00000E+00	4.29726E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.93333E+00	6.71605E-06	0.00000E+00	0.00000E+00	6.71605E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.96667E+00	8.44161E-06	0.00000E+00	0.00000E+00	8.44161E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.00000E+00	9.54621E-06	0.00000E+00	0.00000E+00	9.54621E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.03333E+00	1.00908E-05	0.00000E+00	0.00000E+00	1.00908E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.06667E+00	1.01312E-05	0.00000E+00	0.00000E+00	1.01312E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.10000E+00	9.78995E-06	0.00000E+00	0.00000E+00	9.78995E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.13333E+00	9.19210E-06	0.00000E+00	0.00000E+00	9.19210E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.16667E+00	8.44253E-06	0.00000E+00	0.00000E+00	8.44253E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.20000E+00	7.45341E-06	0.00000E+00	0.00000E+00	7.45341E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.23333E+00	6.39551E-06	0.00000E+00	0.00000E+00	6.39551E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.26667E+00	5.30133E-06	0.00000E+00	0.00000E+00	5.30133E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.30000E+00	4.23745E-06	0.00000E+00	0.00000E+00	4.23745E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.33333E+00	3.24271E-06	0.00000E+00	0.00000E+00	3.24271E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

2.36667E+00	2.28185E-06	0.00000E+00	0.00000E+00	2.28185E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.40000E+00	1.46876E-06	0.00000E+00	0.00000E+00	1.46876E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.43333E+00	7.79421E-07	0.00000E+00	0.00000E+00	7.79421E-07	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.46667E+00	1.88516E-07	0.00000E+00	0.00000E+00	1.88516E-07	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.50000E+00	2.94779E-07	0.00000E+00	0.00000E+00	2.94779E-07	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.53333E+00	6.64780E-07	0.00000E+00	0.00000E+00	6.64780E-07	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.56667E+00	9.33748E-07	0.00000E+00	0.00000E+00	9.33748E-07	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.60000E+00	1.06338E-06	0.00000E+00	0.00000E+00	1.06338E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.63333E+00	1.21523E-06	0.00000E+00	0.00000E+00	1.21523E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.66667E+00	1.34566E-06	0.00000E+00	0.00000E+00	1.34566E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.70000E+00	1.32528E-06	0.00000E+00	0.00000E+00	1.32528E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.73333E+00	1.37072E-06	0.00000E+00	0.00000E+00	1.37072E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.76667E+00	1.38061E-06	0.00000E+00	0.00000E+00	1.38061E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.80000E+00	1.26842E-06	0.00000E+00	0.00000E+00	1.26842E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.83333E+00	1.09652E-06	0.00000E+00	0.00000E+00	1.09652E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.86667E+00	9.03745E-07	0.00000E+00	0.00000E+00	9.03745E-07	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.90000E+00	6.57714E-07	0.00000E+00	0.00000E+00	6.57714E-07	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.93333E+00	4.01584E-07	0.00000E+00	0.00000E+00	4.01584E-07	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.96667E+00	3.37348E-07	0.00000E+00	0.00000E+00	3.37348E-07	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.00000E+00	2.83173E-07	0.00000E+00	0.00000E+00	2.83173E-07	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.03333E+00	1.74210E-07	0.00000E+00	0.00000E+00	1.74210E-07	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.06667E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.10000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.13333E+00	1.39718E-01	-1.24657E-01	0.00000E+00	-6.31003E-02	8.54094E-03	0.00000E+00	8.54094E-03	0.00000E+00	0.00000E+00
3.16667E+00	7.02541E-01	-6.48619E-01	0.00000E+00	-2.69921E-01	3.65771E-02	0.00000E+00	3.65771E-02	0.00000E+00	0.00000E+00
3.20000E+00	5.09229E-01	-5.03216E-01	0.00000E+00	-7.80242E-02	1.26069E-02	0.00000E+00	1.26069E-02	0.00000E+00	0.00000E+00
3.23333E+00	5.66361E-01	-5.65894E-01	0.00000E+00	-2.29962E-02	6.84705E-03	0.00000E+00	6.84705E-03	0.00000E+00	0.00000E+00
3.26667E+00	6.72853E-01	-6.72851E-01	0.00000E+00	-1.62067E-03	5.29419E-03	0.00000E+00	5.29419E-03	0.00000E+00	0.00000E+00
3.30000E+00	9.40985E-01	-9.37898E-01	0.00000E+00	-7.61635E-02	4.67985E-02	0.00000E+00	4.67985E-02	0.00000E+00	0.00000E+00
3.33333E+00	4.26407E+00	-3.79524E+00	0.00000E+00	-1.94382E+00	9.50891E-01	0.00000E+00	9.50891E-01	0.00000E+00	0.00000E+00
3.36667E+00	8.65639E+00	-6.61009E+00	0.00000E+00	-5.58937E+00	2.43563E+00	0.00000E+00	2.43563E+00	0.00000E+00	0.00000E+00
3.40000E+00	9.78599E+00	-7.17629E+00	0.00000E+00	-6.65331E+00	2.88626E+00	0.00000E+00	2.88626E+00	0.00000E+00	0.00000E+00
3.43333E+00	8.46133E+00	-6.85195E+00	0.00000E+00	-4.96435E+00	2.35747E+00	0.00000E+00	2.35747E+00	0.00000E+00	0.00000E+00
3.46667E+00	7.26155E+00	-6.51697E+00	0.00000E+00	-3.20300E+00	1.83683E+00	0.00000E+00	1.83683E+00	0.00000E+00	0.00000E+00
3.50000E+00	6.43323E+00	-6.22182E+00	0.00000E+00	-1.63566E+00	1.39522E+00	0.00000E+00	1.39522E+00	0.00000E+00	0.00000E+00
3.53333E+00	5.99218E+00	-5.97922E+00	0.00000E+00	-3.93898E-01	9.96195E-01	0.00000E+00	9.96195E-01	0.00000E+00	0.00000E+00
3.56667E+00	5.82356E+00	-5.80930E+00	0.00000E+00	4.07325E-01	5.97286E-01	0.00000E+00	5.97286E-01	0.00000E+00	0.00000E+00
3.60000E+00	5.73829E+00	-5.68511E+00	0.00000E+00	7.79431E-01	1.89890E-01	0.00000E+00	1.89890E-01	0.00000E+00	0.00000E+00
3.63333E+00	5.56998E+00	-5.45958E+00	0.00000E+00	1.10345E+00	1.19297E-01	0.00000E+00	1.19297E-01	0.00000E+00	0.00000E+00
3.66667E+00	5.53585E+00	-5.25298E+00	0.00000E+00	1.74697E+00	2.29810E-01	0.00000E+00	2.29810E-01	0.00000E+00	0.00000E+00
3.70000E+00	5.58490E+00	-5.09436E+00	0.00000E+00	2.28882E+00	2.87153E-01	0.00000E+00	2.87153E-01	0.00000E+00	0.00000E+00
3.73333E+00	5.60213E+00	-4.95224E+00	0.00000E+00	2.61900E+00	3.34442E-01	0.00000E+00	3.34442E-01	0.00000E+00	0.00000E+00
3.76667E+00	5.56197E+00	-4.82252E+00	0.00000E+00	2.77107E+00	3.69260E-01	0.00000E+00	3.69260E-01	0.00000E+00	0.00000E+00
3.80000E+00	5.46242E+00	-4.70458E+00	0.00000E+00	2.77578E+00	3.90909E-01	0.00000E+00	3.90909E-01	0.00000E+00	0.00000E+00
3.83333E+00	5.26962E+00	-4.61699E+00	0.00000E+00	2.54016E+00	3.57718E-01	0.00000E+00	3.57718E-01	0.00000E+00	0.00000E+00
3.86667E+00	4.76798E+00	-4.40985E+00	0.00000E+00	1.81296E+00	1.66034E-01	0.00000E+00	1.66034E-01	0.00000E+00	0.00000E+00
3.90000E+00	4.32710E+00	-4.08675E+00	0.00000E+00	1.42205E+00	1.02441E-01	0.00000E+00	1.02441E-01	0.00000E+00	0.00000E+00
3.93333E+00	4.13661E+00	-3.91220E+00	0.00000E+00	1.34395E+00	1.55872E-01	0.00000E+00	1.55872E-01	0.00000E+00	0.00000E+00
3.96667E+00	3.97034E+00	-3.76986E+00	0.00000E+00	1.24568E+00	2.02070E-01	0.00000E+00	2.02070E-01	0.00000E+00	0.00000E+00
4.00000E+00	3.80297E+00	-3.63562E+00	0.00000E+00	1.11572E+00	2.34966E-01	0.00000E+00	2.34966E-01	0.00000E+00	0.00000E+00
4.03333E+00	3.63895E+00	-3.50907E+00	0.00000E+00	9.63513E-01	2.57031E-01	0.00000E+00	2.57031E-01	0.00000E+00	0.00000E+00
4.06667E+00	3.48484E+00	-3.39087E+00	0.00000E+00	8.03805E-01	2.72164E-01	0.00000E+00	2.72164E-01	0.00000E+00	0.00000E+00
4.10000E+00	3.34305E+00	-3.28035E+00	0.00000E+00	6.44402E-01	2.82076E-01	0.00000E+00	2.82076E-01	0.00000E+00	0.00000E+00
4.13333E+00	3.21454E+00	-3.17682E+00	0.00000E+00	4.91015E-01	2.87986E-01	0.00000E+00	2.87986E-01	0.00000E+00	0.00000E+00
4.16667E+00	3.09917E+00	-3.07952E+00	0.00000E+00	3.48375E-01	2.90968E-01	0.00000E+00	2.90968E-01	0.00000E+00	0.00000E+00



4.20000E+00	2.99599E+00	-2.98799E+00	0.00000E+00	2.18896E-01	2.91643E-01	0.00000E+00	2.91643E-01	0.00000E+00
4.23333E+00	2.90361E+00	-2.90173E+00	0.00000E+00	1.04401E-01	2.90552E-01	0.00000E+00	2.90552E-01	0.00000E+00
4.26667E+00	2.82033E+00	-2.82033E+00	0.00000E+00	5.98751E-03	2.88128E-01	0.00000E+00	2.88128E-01	0.00000E+00
4.30000E+00	2.74442E+00	-2.74337E+00	0.00000E+00	-7.59248E-02	2.84696E-01	0.00000E+00	2.84696E-01	0.00000E+00
4.33333E+00	2.67425E+00	-2.67050E+00	0.00000E+00	-1.41498E-01	2.80490E-01	0.00000E+00	2.80490E-01	0.00000E+00
4.36667E+00	2.60844E+00	-2.60141E+00	0.00000E+00	-1.91362E-01	2.75672E-01	0.00000E+00	2.75672E-01	0.00000E+00
4.40000E+00	2.54597E+00	-2.53590E+00	0.00000E+00	-2.26212E-01	2.70312E-01	0.00000E+00	2.70312E-01	0.00000E+00
4.43333E+00	2.48598E+00	-2.47364E+00	0.00000E+00	-2.47375E-01	2.64509E-01	0.00000E+00	2.64509E-01	0.00000E+00
4.46667E+00	2.42793E+00	-2.41435E+00	0.00000E+00	-2.56427E-01	2.58311E-01	0.00000E+00	2.58311E-01	0.00000E+00
4.50000E+00	2.37160E+00	-2.35784E+00	0.00000E+00	-2.55085E-01	2.51741E-01	0.00000E+00	2.51741E-01	0.00000E+00
4.53333E+00	2.31692E+00	-2.30390E+00	0.00000E+00	-2.45247E-01	2.44860E-01	0.00000E+00	2.44860E-01	0.00000E+00
4.56667E+00	2.26397E+00	-2.25238E+00	0.00000E+00	-2.28838E-01	2.37750E-01	0.00000E+00	2.37750E-01	0.00000E+00
4.60000E+00	2.21287E+00	-2.20310E+00	0.00000E+00	-2.07698E-01	2.30490E-01	0.00000E+00	2.30490E-01	0.00000E+00
4.63333E+00	2.16374E+00	-2.15594E+00	0.00000E+00	-1.83492E-01	2.23153E-01	0.00000E+00	2.23153E-01	0.00000E+00
4.66667E+00	2.11664E+00	-2.11076E+00	0.00000E+00	-1.57677E-01	2.15796E-01	0.00000E+00	2.15796E-01	0.00000E+00
4.70000E+00	2.07160E+00	-2.06743E+00	0.00000E+00	-1.31485E-01	2.08468E-01	0.00000E+00	2.08468E-01	0.00000E+00
4.73333E+00	2.02861E+00	-2.02584E+00	0.00000E+00	-1.05924E-01	2.01210E-01	0.00000E+00	2.01210E-01	0.00000E+00
4.76667E+00	1.98757E+00	-1.98589E+00	0.00000E+00	-8.17785E-02	1.94053E-01	0.00000E+00	1.94053E-01	0.00000E+00
4.80000E+00	1.94840E+00	-1.94749E+00	0.00000E+00	-5.96281E-02	1.87023E-01	0.00000E+00	1.87023E-01	0.00000E+00
4.83333E+00	1.91096E+00	-1.91054E+00	0.00000E+00	-3.99077E-02	1.80140E-01	0.00000E+00	1.80140E-01	0.00000E+00
4.86667E+00	1.87511E+00	-1.87497E+00	0.00000E+00	-2.27936E-02	1.73417E-01	0.00000E+00	1.73417E-01	0.00000E+00
4.90000E+00	1.84072E+00	-1.84070E+00	0.00000E+00	-8.37852E-03	1.66866E-01	0.00000E+00	1.66866E-01	0.00000E+00
4.93333E+00	1.80766E+00	-1.80765E+00	0.00000E+00	3.35266E-03	1.60499E-01	0.00000E+00	1.60499E-01	0.00000E+00
4.96667E+00	1.77583E+00	-1.77578E+00	0.00000E+00	1.25103E-02	1.54321E-01	0.00000E+00	1.54321E-01	0.00000E+00
5.00000E+00	1.74512E+00	-1.74501E+00	0.00000E+00	1.92775E-02	1.48336E-01	0.00000E+00	1.48336E-01	0.00000E+00
5.03333E+00	1.71546E+00	-1.71529E+00	0.00000E+00	2.38906E-02	1.42549E-01	0.00000E+00	1.42549E-01	0.00000E+00
5.06667E+00	1.68677E+00	-1.68656E+00	0.00000E+00	2.66178E-02	1.36958E-01	0.00000E+00	1.36958E-01	0.00000E+00
5.10000E+00	1.65901E+00	-1.65878E+00	0.00000E+00	2.77419E-02	1.31563E-01	0.00000E+00	1.31563E-01	0.00000E+00
5.13333E+00	1.63213E+00	-1.63190E+00	0.00000E+00	2.75470E-02	1.26363E-01	0.00000E+00	1.26363E-01	0.00000E+00
5.16667E+00	1.60609E+00	-1.60588E+00	0.00000E+00	2.63087E-02	1.21354E-01	0.00000E+00	1.21354E-01	0.00000E+00
5.20000E+00	1.58086E+00	-1.58067E+00	0.00000E+00	2.42863E-02	1.16532E-01	0.00000E+00	1.16532E-01	0.00000E+00
5.23333E+00	1.55640E+00	-1.55624E+00	0.00000E+00	2.17158E-02	1.11893E-01	0.00000E+00	1.11893E-01	0.00000E+00
5.26667E+00	1.53268E+00	-1.53256E+00	0.00000E+00	1.88053E-02	1.07432E-01	0.00000E+00	1.07432E-01	0.00000E+00
5.30000E+00	1.50967E+00	-1.50959E+00	0.00000E+00	1.57332E-02	1.03143E-01	0.00000E+00	1.03143E-01	0.00000E+00
5.33333E+00	1.48735E+00	-1.48729E+00	0.00000E+00	1.26481E-02	9.90222E-02	0.00000E+00	9.90222E-02	0.00000E+00
5.36667E+00	1.46568E+00	-1.46565E+00	0.00000E+00	9.66787E-03	9.50630E-02	0.00000E+00	9.50630E-02	0.00000E+00
5.40000E+00	1.44464E+00	-1.44462E+00	0.00000E+00	6.88620E-03	9.12600E-02	0.00000E+00	9.12600E-02	0.00000E+00
5.43333E+00	1.42420E+00	-1.42419E+00	0.00000E+00	4.36790E-03	8.76075E-02	0.00000E+00	8.76075E-02	0.00000E+00
5.46667E+00	1.40433E+00	-1.40433E+00	0.00000E+00	2.15530E-03	8.41000E-02	0.00000E+00	8.41000E-02	0.00000E+00
5.50000E+00	1.38502E+00	-1.38502E+00	0.00000E+00	2.71670E-04	8.07322E-02	0.00000E+00	8.07322E-02	0.00000E+00
5.53333E+00	1.36623E+00	-1.36623E+00	0.00000E+00	-1.27740E-03	7.74988E-02	0.00000E+00	7.74988E-02	0.00000E+00
5.56667E+00	1.34794E+00	-1.34794E+00	0.00000E+00	-2.49977E-03	7.43950E-02	0.00000E+00	7.43950E-02	0.00000E+00
5.60000E+00	1.33014E+00	-1.33014E+00	0.00000E+00	-3.41306E-03	7.14158E-02	0.00000E+00	7.14158E-02	0.00000E+00
5.63333E+00	1.31280E+00	-1.31280E+00	0.00000E+00	-4.0412E-03	6.85563E-02	0.00000E+00	6.85563E-02	0.00000E+00
5.66667E+00	1.29591E+00	-1.29590E+00	0.00000E+00	-4.42522E-03	6.58120E-02	0.00000E+00	6.58120E-02	0.00000E+00
5.70000E+00	1.27945E+00	-1.27944E+00	0.00000E+00	-4.59071E-03	6.31781E-02	0.00000E+00	6.31781E-02	0.00000E+00
5.73333E+00	1.26339E+00	-1.26339E+00	0.00000E+00	-4.57566E-03	6.06503E-02	0.00000E+00	6.06503E-02	0.00000E+00
5.76667E+00	1.24774E+00	-1.24773E+00	0.00000E+00	-4.41500E-03	5.82243E-02	0.00000E+00	5.82243E-02	0.00000E+00
5.80000E+00	1.23247E+00	-1.23246E+00	0.00000E+00	-4.14218E-03	5.58960E-02	0.00000E+00	5.58960E-02	0.00000E+00
5.83333E+00	1.21757E+00	-1.21756E+00	0.00000E+00	-3.78830E-03	5.36614E-02	0.00000E+00	5.36614E-02	0.00000E+00
5.86667E+00	1.20302E+00	-1.20302E+00	0.00000E+00	-3.38131E-03	5.15168E-02	0.00000E+00	5.15168E-02	0.00000E+00
5.90000E+00	1.18882E+00	-1.18882E+00	0.00000E+00	-2.94563E-03	4.94584E-02	0.00000E+00	4.94584E-02	0.00000E+00
5.93333E+00	1.17495E+00	-1.17495E+00	0.00000E+00	-2.50202E-03	4.74827E-02	0.00000E+00	4.74827E-02	0.00000E+00
5.96667E+00	1.16140E+00	-1.16139E+00	0.00000E+00	-2.06733E-03	4.55863E-02	0.00000E+00	4.55863E-02	0.00000E+00

## boat30.out

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6.00000E+00 1.14815E+00 -1.14815E+00 0.00000E+00 -1.65484E-03 4.37661E-02 0.00000E+00 4.37661E-02 0.00000E+00  
1Boat 30 mph  
Request Number 3003

## Target Boat Acceleration

Acceleration of Marker 300100 relative to Marker 1003001

Time	Accm	Accx	Accy	Accz	WmDot	WxDot	WyDot	WzDot
0.00000E+00	5.51117E-02	0.00000E+00	0.00000E+00	-5.51117E-02	7.55225E-07	0.00000E+00	7.55225E-07	0.00000E+00
3.33333E-02	4.32558E-02	0.00000E+00	0.00000E+00	-4.32558E-02	4.22301E-07	0.00000E+00	4.22301E-07	0.00000E+00
6.66667E-02	3.21773E-02	0.00000E+00	0.00000E+00	-3.21773E-02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.00000E-01	2.21084E-02	0.00000E+00	0.00000E+00	-2.21084E-02	2.86601E-07	0.00000E+00	2.86601E-07	0.00000E+00
1.33333E-01	1.32188E-02	0.00000E+00	0.00000E+00	-1.32188E-02	4.52020E-07	0.00000E+00	4.52020E-07	0.00000E+00
1.66667E-01	5.59783E-03	0.00000E+00	0.00000E+00	-5.59783E-03	4.72600E-07	0.00000E+00	4.72600E-07	0.00000E+00
2.00000E-01	7.27872E-04	0.00000E+00	0.00000E+00	7.27872E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.33333E-01	5.77930E-03	0.00000E+00	0.00000E+00	5.77930E-03	2.10207E-07	0.00000E+00	2.10207E-07	0.00000E+00
2.66667E-01	9.61574E-03	0.00000E+00	0.00000E+00	9.61574E-03	2.62844E-07	0.00000E+00	2.62844E-07	0.00000E+00
3.00000E-01	1.23372E-02	0.00000E+00	0.00000E+00	1.23372E-02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E-01	1.40667E-02	0.00000E+00	0.00000E+00	1.40667E-02	3.45256E-07	0.00000E+00	3.45256E-07	0.00000E+00
3.66667E-01	1.49364E-02	0.00000E+00	0.00000E+00	1.49364E-02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.00000E-01	1.51025E-02	0.00000E+00	0.00000E+00	1.51025E-02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.33333E-01	1.46916E-02	0.00000E+00	0.00000E+00	1.46916E-02	1.34316E-07	0.00000E+00	1.34316E-07	0.00000E+00
4.66667E-01	1.38258E-02	0.00000E+00	0.00000E+00	1.38258E-02	1.20167E-07	0.00000E+00	1.20167E-07	0.00000E+00
5.00000E-01	1.26234E-02	0.00000E+00	0.00000E+00	1.26234E-02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.33333E-01	1.11881E-02	0.00000E+00	0.00000E+00	1.11881E-02	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.66667E-01	9.62808E-03	0.00000E+00	0.00000E+00	9.62808E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.00000E-01	8.02827E-03	0.00000E+00	0.00000E+00	8.02827E-03	1.73689E-07	0.00000E+00	1.73689E-07	0.00000E+00
6.33333E-01	6.44933E-03	0.00000E+00	0.00000E+00	6.44933E-03	3.16745E-07	0.00000E+00	3.16745E-07	0.00000E+00
6.66667E-01	4.95526E-03	0.00000E+00	0.00000E+00	4.95526E-03	2.55481E-07	0.00000E+00	2.55481E-07	0.00000E+00
7.00000E-01	3.57544E-03	0.00000E+00	0.00000E+00	3.57544E-03	2.48953E-07	0.00000E+00	2.48953E-07	0.00000E+00
7.33333E-01	2.33763E-03	0.00000E+00	0.00000E+00	2.33763E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
7.66667E-01	1.26210E-03	0.00000E+00	0.00000E+00	1.26210E-03	3.47249E-07	0.00000E+00	3.47249E-07	0.00000E+00
8.00000E-01	3.49171E-04	0.00000E+00	0.00000E+00	3.49171E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
8.33333E-01	3.93616E-04	0.00000E+00	0.00000E+00	-3.93616E-04	1.28412E-07	0.00000E+00	-1.28412E-07	0.00000E+00
8.66667E-01	9.72632E-04	0.00000E+00	0.00000E+00	-9.72632E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9.00000E-01	1.40502E-03	0.00000E+00	0.00000E+00	-1.40502E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9.33333E-01	1.69992E-03	0.00000E+00	0.00000E+00	-1.69992E-03	3.67091E-07	0.00000E+00	-3.67091E-07	0.00000E+00
9.66667E-01	1.87031E-03	0.00000E+00	0.00000E+00	-1.87031E-03	1.73255E-07	0.00000E+00	1.73255E-07	0.00000E+00
1.00000E+00	1.94086E-03	0.00000E+00	0.00000E+00	-1.94086E-03	3.30214E-07	0.00000E+00	3.30214E-07	0.00000E+00
1.03333E+00	1.93038E-03	0.00000E+00	0.00000E+00	-1.93038E-03	1.29661E-07	0.00000E+00	-1.29661E-07	0.00000E+00
1.06667E+00	1.84653E-03	0.00000E+00	0.00000E+00	-1.84653E-03	3.74357E-07	0.00000E+00	3.74357E-07	0.00000E+00
1.10000E+00	1.71852E-03	0.00000E+00	0.00000E+00	-1.71852E-03	2.04688E-07	0.00000E+00	-2.04688E-07	0.00000E+00
1.13333E+00	1.54806E-03	0.00000E+00	0.00000E+00	-1.54806E-03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.16667E+00	1.35596E-03	0.00000E+00	0.00000E+00	-1.35596E-03	1.84396E-07	0.00000E+00	1.84396E-07	0.00000E+00
1.20000E+00	1.15159E-03	0.00000E+00	0.00000E+00	-1.15159E-03	3.01155E-07	0.00000E+00	3.01155E-07	0.00000E+00
1.23333E+00	9.48663E-04	0.00000E+00	0.00000E+00	-9.48663E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.26667E+00	7.52571E-04	0.00000E+00	0.00000E+00	-7.52571E-04	2.69847E-07	0.00000E+00	-2.69847E-07	0.00000E+00
1.30000E+00	5.61796E-04	0.00000E+00	0.00000E+00	-5.61796E-04	1.02057E-07	0.00000E+00	1.02057E-07	0.00000E+00
1.33333E+00	3.94935E-04	0.00000E+00	0.00000E+00	-3.94935E-04	4.21844E-07	0.00000E+00	-4.21844E-07	0.00000E+00
1.36667E+00	2.42183E-04	0.00000E+00	0.00000E+00	-2.42183E-04	1.74389E-07	0.00000E+00	-1.74389E-07	0.00000E+00
1.40000E+00	1.08190E-04	0.00000E+00	0.00000E+00	-1.08190E-04	4.29944E-07	0.00000E+00	4.29944E-07	0.00000E+00
1.43333E+00	9.82752E-07	0.00000E+00	0.00000E+00	-9.82752E-07	3.29543E-07	0.00000E+00	3.29543E-07	0.00000E+00
1.46667E+00	8.08741E-05	0.00000E+00	0.00000E+00	8.08741E-05	3.12821E-07	0.00000E+00	-3.12821E-07	0.00000E+00
1.50000E+00	1.52247E-04	0.00000E+00	0.00000E+00	1.52247E-04	2.93821E-07	0.00000E+00	2.93821E-07	0.00000E+00

1.53333E+00	1.96446E-04	0.00000E+00	0.00000E+00	1.96446E-04	1.76076E-07	0.00000E+00	-1.76076E-07	0.00000E+00
1.56667E+00	2.28681E-04	0.00000E+00	0.00000E+00	2.28681E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.60000E+00	2.46705E-04	0.00000E+00	0.00000E+00	2.46705E-04	1.12180E-07	0.00000E+00	1.12180E-07	0.00000E+00
1.63333E+00	2.50974E-04	0.00000E+00	0.00000E+00	2.50974E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.66667E+00	2.45270E-04	0.00000E+00	0.00000E+00	2.45270E-04	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.70000E+00	2.33188E-04	0.00000E+00	0.00000E+00	2.33188E-04	1.62981E-07	0.00000E+00	1.62981E-07	0.00000E+00
1.73333E+00	2.14355E-04	0.00000E+00	0.00000E+00	2.14355E-04	1.54613E-07	0.00000E+00	1.54613E-07	0.00000E+00
1.76667E+00	1.91404E-04	0.00000E+00	0.00000E+00	1.91404E-04	2.64025E-07	0.00000E+00	2.64025E-07	0.00000E+00
1.80000E+00	1.66663E-04	0.00000E+00	0.00000E+00	1.66663E-04	3.74965E-07	0.00000E+00	3.74965E-07	0.00000E+00
1.83333E+00	1.39788E-04	0.00000E+00	0.00000E+00	1.39788E-04	2.64822E-07	0.00000E+00	2.64822E-07	0.00000E+00
1.86667E+00	1.08596E-04	0.00000E+00	0.00000E+00	1.08596E-04	4.00624E-07	0.00000E+00	4.00624E-07	0.00000E+00
1.90000E+00	8.49313E-05	0.00000E+00	0.00000E+00	8.49313E-05	1.39505E-07	0.00000E+00	1.39505E-07	0.00000E+00
1.93333E+00	6.20776E-05	0.00000E+00	0.00000E+00	6.20776E-05	1.95881E-07	0.00000E+00	1.95881E-07	0.00000E+00
1.96667E+00	4.14395E-05	0.00000E+00	0.00000E+00	4.14395E-05	1.56242E-07	0.00000E+00	1.56242E-07	0.00000E+00
2.00000E+00	2.42721E-05	0.00000E+00	0.00000E+00	2.42721E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.03333E+00	8.58147E-06	0.00000E+00	0.00000E+00	8.58147E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.06667E+00	5.79213E-06	0.00000E+00	0.00000E+00	5.79213E-06	1.26032E-07	0.00000E+00	1.26032E-07	0.00000E+00
2.10000E+00	1.47179E-05	0.00000E+00	0.00000E+00	1.47179E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.13333E+00	2.19452E-05	0.00000E+00	0.00000E+00	2.19452E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.16667E+00	2.44666E-05	0.00000E+00	0.00000E+00	2.44666E-05	3.40994E-07	0.00000E+00	3.40994E-07	0.00000E+00
2.20000E+00	3.23910E-05	0.00000E+00	0.00000E+00	3.23910E-05	1.60118E-07	0.00000E+00	1.60118E-07	0.00000E+00
2.23333E+00	3.27433E-05	0.00000E+00	0.00000E+00	3.27433E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.26667E+00	3.31471E-05	0.00000E+00	0.00000E+00	3.31471E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.30000E+00	3.08701E-05	0.00000E+00	0.00000E+00	3.08701E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.33333E+00	2.84219E-05	0.00000E+00	0.00000E+00	2.84219E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.36667E+00	2.86700E-05	0.00000E+00	0.00000E+00	2.86700E-05	3.67581E-07	0.00000E+00	3.67581E-07	0.00000E+00
2.40000E+00	2.20154E-05	0.00000E+00	0.00000E+00	2.20154E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.43333E+00	1.88884E-05	0.00000E+00	0.00000E+00	1.88884E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.46667E+00	1.61171E-05	0.00000E+00	0.00000E+00	1.61171E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.50000E+00	1.29192E-05	0.00000E+00	0.00000E+00	1.29192E-05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.53333E+00	9.32296E-06	0.00000E+00	0.00000E+00	9.32296E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.56667E+00	6.61544E-06	0.00000E+00	0.00000E+00	6.61544E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.60000E+00	1.81365E-06	0.00000E+00	0.00000E+00	1.81365E-06	2.87813E-07	0.00000E+00	2.87813E-07	0.00000E+00
2.63333E+00	5.53810E-06	0.00000E+00	0.00000E+00	5.53810E-06	4.09740E-07	0.00000E+00	4.09740E-07	0.00000E+00
2.66667E+00	4.91459E-07	0.00000E+00	0.00000E+00	4.91459E-07	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.70000E+00	1.79368E-06	0.00000E+00	0.00000E+00	1.79368E-06	1.16514E-07	0.00000E+00	1.16514E-07	0.00000E+00
2.73333E+00	3.32186E-06	0.00000E+00	0.00000E+00	3.32186E-06	1.30195E-07	0.00000E+00	1.30195E-07	0.00000E+00
2.76667E+00	2.02646E-06	0.00000E+00	0.00000E+00	2.02646E-06	1.04621E-07	0.00000E+00	1.04621E-07	0.00000E+00
2.80000E+00	6.06168E-06	0.00000E+00	0.00000E+00	6.06168E-06	2.80771E-07	0.00000E+00	2.80771E-07	0.00000E+00
2.83333E+00	5.42953E-06	0.00000E+00	0.00000E+00	5.42953E-06	1.59023E-07	0.00000E+00	1.59023E-07	0.00000E+00
2.86667E+00	5.70762E-06	0.00000E+00	0.00000E+00	5.70762E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.90000E+00	8.50373E-06	0.00000E+00	0.00000E+00	8.50373E-06	5.90961E-07	0.00000E+00	5.90961E-07	0.00000E+00
2.93333E+00	6.14531E-06	0.00000E+00	0.00000E+00	6.14531E-06	2.99228E-07	0.00000E+00	2.99228E-07	0.00000E+00
2.96667E+00	1.20423E-06	0.00000E+00	0.00000E+00	1.20423E-06	2.50340E-07	0.00000E+00	2.50340E-07	0.00000E+00
3.00000E+00	3.62542E-06	0.00000E+00	0.00000E+00	3.62542E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.03333E+00	3.07048E-06	0.00000E+00	0.00000E+00	3.07048E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.06667E+00	2.44682E-06	0.00000E+00	0.00000E+00	2.44682E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.10000E+00	1.96150E-06	0.00000E+00	0.00000E+00	1.96150E-06	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.13333E+00	2.42422E+01	-2.14168E+01	0.00000E+00	-1.13581E+01	1.53735E+00	0.00000E+00	1.53735E+00	0.00000E+00
3.16667E+00	3.110820E+00	-2.28967E+00	0.00000E+00	2.10198E+00	2.42941E-01	0.00000E+00	2.42941E-01	0.00000E+00
3.20000E+00	3.32123E+00	-3.144456E+00	0.00000E+00	1.06879E+00	9.43275E-02	0.00000E+00	9.43275E-02	0.00000E+00
3.23333E+00	3.21730E+00	-3.124460E+00	0.00000E+00	7.66721E-01	5.93044E-02	0.00000E+00	5.93044E-02	0.00000E+00
3.26667E+00	3.15045E+00	-3.08513E+00	0.00000E+00	6.38211E-01	5.05492E-02	0.00000E+00	5.05492E-02	0.00000E+00
3.30000E+00	3.30882E+01	-2.94685E+01	0.00000E+00	-1.50477E+01	8.36591E+00	0.00000E+00	8.36591E+00	0.00000E+00

3.33333E+00	1.54187E+02	-1.20853E+02	0.00000E+00	-9.57519E+01	4.46327E+01	0.00000E+00	-4.46327E+01	0.00000E+00
3.36667E+00	1.08012E+02	-4.44009E+01	0.00000E+00	-9.84634E+01	3.83173E+01	0.00000E+00	-3.83173E+01	0.00000E+00
3.40000E+00	3.07334E+01	5.11763E+00	0.00000E+00	3.02943E+01	9.16377E+00	0.00000E+00	9.16377E+00	0.00000E+00
3.43333E+00	5.67015E+01	1.07663E+01	0.00000E+00	5.56700E+01	1.70180E+01	0.00000E+00	1.70180E+01	0.00000E+00
3.46667E+00	5.11126E+01	9.43216E+00	0.00000E+00	5.02348E+01	1.43825E+01	0.00000E+00	1.43825E+01	0.00000E+00
3.50000E+00	4.43631E+01	8.27895E+00	0.00000E+00	4.35838E+01	1.21552E+01	0.00000E+00	1.21552E+01	0.00000E+00
3.53333E+00	2.93161E+01	5.89048E+00	0.00000E+00	2.87182E+01	1.25080E+01	0.00000E+00	1.25080E+01	0.00000E+00
3.56667E+00	1.71030E+01	3.90151E+00	0.00000E+00	1.66520E+01	1.22571E+01	0.00000E+00	1.22571E+01	0.00000E+00
3.60000E+00	5.80731E+00	3.29867E+00	0.00000E+00	4.77931E+00	1.24551E+01	0.00000E+00	1.24551E+01	0.00000E+00
3.63333E+00	1.90725E+01	8.62455E+00	0.00000E+00	1.70111E+01	5.42519E+00	0.00000E+00	5.42519E+00	0.00000E+00
3.66667E+00	1.95814E+01	5.00023E+00	0.00000E+00	1.89323E+01	2.11518E+00	0.00000E+00	2.11518E+00	0.00000E+00
3.70000E+00	1.34159E+01	4.51128E+00	0.00000E+00	1.26347E+01	1.67237E+00	0.00000E+00	1.67237E+00	0.00000E+00
3.73333E+00	8.11500E+00	4.08593E+00	0.00000E+00	7.05181E+00	1.24629E+00	0.00000E+00	1.24629E+00	0.00000E+00
3.76667E+00	4.32295E+00	3.70821E+00	0.00000E+00	2.22196E+00	8.37856E-01	0.00000E+00	8.37856E-01	0.00000E+00
3.80000E+00	3.81503E+00	3.37347E+00	0.00000E+00	1.78160E+00	4.68198E-01	0.00000E+00	4.68198E-01	0.00000E+00
3.83333E+00	1.83583E+01	5.53908E-01	0.00000E+00	-1.83500E+01	4.63887E+00	0.00000E+00	-4.63887E+00	0.00000E+00
3.86667E+00	2.48298E+01	1.22899E+01	0.00000E+00	-2.15749E+01	5.58632E+00	0.00000E+00	-5.58632E+00	0.00000E+00
3.90000E+00	5.21656E+00	4.97541E+00	0.00000E+00	-1.56773E+00	1.87173E+00	0.00000E+00	1.87173E+00	0.00000E+00
3.93333E+00	5.34858E+00	4.55948E+00	0.00000E+00	-2.79615E+00	1.44721E+00	0.00000E+00	1.44721E+00	0.00000E+00
3.96667E+00	5.68419E+00	4.23374E+00	0.00000E+00	-3.79282E+00	1.06361E+00	0.00000E+00	1.06361E+00	0.00000E+00
4.00000E+00	5.92786E+00	3.93758E+00	0.00000E+00	-4.43114E+00	7.65767E-01	0.00000E+00	7.65767E-01	0.00000E+00
4.03333E+00	6.00468E+00	3.66824E+00	0.00000E+00	-4.75396E+00	5.40393E-01	0.00000E+00	5.40393E-01	0.00000E+00
4.06667E+00	5.92722E+00	3.42527E+00	0.00000E+00	-4.83730E+00	3.64907E-01	0.00000E+00	3.64907E-01	0.00000E+00
4.10000E+00	5.71417E+00	3.20563E+00	0.00000E+00	-4.73028E+00	2.29059E-01	0.00000E+00	2.29059E-01	0.00000E+00
4.13333E+00	5.39167E+00	3.00647E+00	0.00000E+00	-4.47563E+00	1.25090E-01	0.00000E+00	1.25090E-01	0.00000E+00
4.16667E+00	4.99391E+00	2.82514E+00	0.00000E+00	-4.11798E+00	4.55583E-02	0.00000E+00	4.55583E-02	0.00000E+00
4.20000E+00	4.54616E+00	2.65969E+00	0.00000E+00	-3.68696E+00	1.43865E-02	0.00000E+00	-1.43865E-02	0.00000E+00
4.23333E+00	4.07388E+00	2.50835E+00	0.00000E+00	-3.21010E+00	5.92099E-02	0.00000E+00	-5.92099E-02	0.00000E+00
4.26667E+00	3.60073E+00	2.36711E+00	0.00000E+00	-2.71116E+00	9.27279E-02	0.00000E+00	-9.27279E-02	0.00000E+00
4.30000E+00	3.14804E+00	2.24203E+00	0.00000E+00	-2.20986E+00	1.18080E-01	0.00000E+00	-1.18080E-01	0.00000E+00
4.33333E+00	2.73480E+00	2.12451E+00	0.00000E+00	-1.72210E+00	1.37772E-01	0.00000E+00	-1.37772E-01	0.00000E+00
4.36667E+00	2.37753E+00	2.01601E+00	0.00000E+00	-1.26031E+00	1.53749E-01	0.00000E+00	-1.53749E-01	0.00000E+00
4.40000E+00	2.08817E+00	1.91574E+00	0.00000E+00	-8.30885E-01	1.67226E-01	0.00000E+00	-1.67226E-01	0.00000E+00
4.43333E+00	1.87610E+00	1.82282E+00	0.00000E+00	-4.43898E-01	1.79517E-01	0.00000E+00	-1.79517E-01	0.00000E+00
4.46667E+00	1.73971E+00	1.73650E+00	0.00000E+00	-1.05669E-01	1.91407E-01	0.00000E+00	-1.91407E-01	0.00000E+00
4.50000E+00	1.66579E+00	1.65615E+00	0.00000E+00	-1.78959E-01	2.02410E-01	0.00000E+00	-2.02410E-01	0.00000E+00
4.53333E+00	1.63196E+00	1.58125E+00	0.00000E+00	4.03660E-01	2.10476E-01	0.00000E+00	-2.10476E-01	0.00000E+00
4.56667E+00	1.61577E+00	1.51131E+00	0.00000E+00	5.71542E-01	2.15968E-01	0.00000E+00	-2.15968E-01	0.00000E+00
4.60000E+00	1.60074E+00	1.44591E+00	0.00000E+00	6.86808E-01	2.19199E-01	0.00000E+00	-2.19199E-01	0.00000E+00
4.63333E+00	1.57373E+00	1.38467E+00	0.00000E+00	7.55492E-01	2.20596E-01	0.00000E+00	-2.20596E-01	0.00000E+00
4.66667E+00	1.54151E+00	1.32724E+00	0.00000E+00	7.84026E-01	2.20422E-01	0.00000E+00	-2.20422E-01	0.00000E+00
4.70000E+00	1.49272E+00	1.27331E+00	0.00000E+00	7.79049E-01	2.18895E-01	0.00000E+00	-2.18895E-01	0.00000E+00
4.73333E+00	1.43291E+00	1.22259E+00	0.00000E+00	7.47328E-01	2.16297E-01	0.00000E+00	-2.16297E-01	0.00000E+00
4.76667E+00	1.36517E+00	1.17485E+00	0.00000E+00	6.95284E-01	2.12857E-01	0.00000E+00	-2.12857E-01	0.00000E+00
4.80000E+00	1.29303E+00	1.12985E+00	0.00000E+00	6.28784E-01	2.08760E-01	0.00000E+00	-2.08760E-01	0.00000E+00
4.83333E+00	1.22005E+00	1.08739E+00	0.00000E+00	5.53274E-01	2.04160E-01	0.00000E+00	-2.04160E-01	0.00000E+00
4.86667E+00	1.14917E+00	1.04728E+00	0.00000E+00	4.73086E-01	1.99159E-01	0.00000E+00	-1.99159E-01	0.00000E+00
4.90000E+00	1.08270E+00	1.00934E+00	0.00000E+00	3.91764E-01	1.93811E-01	0.00000E+00	-1.93811E-01	0.00000E+00
4.93333E+00	1.02236E+00	9.73431E-01	0.00000E+00	3.12493E-01	1.88210E-01	0.00000E+00	-1.88210E-01	0.00000E+00
4.96667E+00	9.69022E-01	9.39404E-01	0.00000E+00	2.37749E-01	1.82447E-01	0.00000E+00	-1.82447E-01	0.00000E+00
5.00000E+00	9.22814E-01	9.07130E-01	0.00000E+00	1.69416E-01	1.76585E-01	0.00000E+00	-1.76585E-01	0.00000E+00
5.03333E+00	8.83208E-01	8.76491E-01	0.00000E+00	1.08717E-01	1.70677E-01	0.00000E+00	-1.70677E-01	0.00000E+00
5.06667E+00	8.49249E-01	8.47378E-01	0.00000E+00	5.63399E-02	1.64772E-01	0.00000E+00	-1.64772E-01	0.00000E+00
5.10000E+00	8.19788E-01	8.19693E-01	0.00000E+00	1.25384E-02	1.58911E-01	0.00000E+00	-1.58911E-01	0.00000E+00

boat30 out

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5.13333E+00	7.93670E-01	7.93342E-01	0.00000E+00	-2.28080E-02	1.53127E-01	0.00000E+00	-1.53127E-01	0.00000E+00	0.00000E+00
5.16667E+00	7.69873E-01	7.68242E-01	0.00000E+00	-5.01003E-02	1.47448E-01	0.00000E+00	-1.47448E-01	0.00000E+00	0.00000E+00
5.20000E+00	7.47595E-01	7.44314E-01	0.00000E+00	-6.99608E-02	1.41894E-01	0.00000E+00	-1.41894E-01	0.00000E+00	0.00000E+00
5.23333E+00	7.26263E-01	7.21487E-01	0.00000E+00	-8.31560E-02	1.36479E-01	0.00000E+00	-1.36479E-01	0.00000E+00	0.00000E+00
5.26667E+00	7.05528E-01	7.00994E-01	0.00000E+00	-9.05425E-02	1.31216E-01	0.00000E+00	-1.31216E-01	0.00000E+00	0.00000E+00
5.30000E+00	6.85218E-01	6.78874E-01	0.00000E+00	-9.30215E-02	1.26113E-01	0.00000E+00	-1.26113E-01	0.00000E+00	0.00000E+00
5.33333E+00	6.65291E-01	6.58970E-01	0.00000E+00	-9.14894E-02	1.21176E-01	0.00000E+00	-1.21176E-01	0.00000E+00	0.00000E+00
5.36667E+00	6.45788E-01	6.39928E-01	0.00000E+00	-8.67989E-02	1.16406E-01	0.00000E+00	-1.16406E-01	0.00000E+00	0.00000E+00
5.40000E+00	6.26796E-01	6.21700E-01	0.00000E+00	-7.97661E-02	1.11804E-01	0.00000E+00	-1.11804E-01	0.00000E+00	0.00000E+00
5.43333E+00	6.08410E-01	6.04240E-01	0.00000E+00	-7.11148E-02	1.07371E-01	0.00000E+00	-1.07371E-01	0.00000E+00	0.00000E+00
5.46667E+00	5.90715E-01	5.87505E-01	0.00000E+00	-6.14967E-02	1.03104E-01	0.00000E+00	-1.03104E-01	0.00000E+00	0.00000E+00
5.50000E+00	5.73769E-01	5.71456E-01	0.00000E+00	-5.14623E-02	9.89926E-02	0.00000E+00	-9.89926E-02	0.00000E+00	0.00000E+00
5.53333E+00	5.57602E-01	5.56056E-01	0.00000E+00	-4.14922E-02	9.50328E-02	0.00000E+00	-9.50328E-02	0.00000E+00	0.00000E+00
5.56667E+00	5.42210E-01	5.41270E-01	0.00000E+00	-3.19271E-02	9.12212E-02	0.00000E+00	-9.12212E-02	0.00000E+00	0.00000E+00
5.60000E+00	5.27569E-01	5.27066E-01	0.00000E+00	-2.30519E-02	8.75563E-02	0.00000E+00	-8.75563E-02	0.00000E+00	0.00000E+00
5.63333E+00	5.13634E-01	5.13413E-01	0.00000E+00	-1.50540E-02	8.40345E-02	0.00000E+00	-8.40345E-02	0.00000E+00	0.00000E+00
5.66667E+00	5.00349E-01	5.00285E-01	0.00000E+00	-8.04746E-03	8.06517E-02	0.00000E+00	-8.06517E-02	0.00000E+00	0.00000E+00
5.70000E+00	4.87658E-01	4.87653E-01	0.00000E+00	-2.08947E-03	7.74034E-02	0.00000E+00	-7.74034E-02	0.00000E+00	0.00000E+00
5.73333E+00	4.75503E-01	4.75494E-01	0.00000E+00	2.80297E-03	7.42855E-02	0.00000E+00	-7.42855E-02	0.00000E+00	0.00000E+00
5.76667E+00	4.63832E-01	4.63784E-01	0.00000E+00	6.85627E-03	7.12943E-02	0.00000E+00	-7.12943E-02	0.00000E+00	0.00000E+00
5.80000E+00	4.52603E-01	4.52502E-01	0.00000E+00	9.54325E-03	6.84234E-02	0.00000E+00	-6.84234E-02	0.00000E+00	0.00000E+00
5.83333E+00	4.41777E-01	4.41626E-01	0.00000E+00	1.15392E-02	6.56697E-02	0.00000E+00	-6.56697E-02	0.00000E+00	0.00000E+00
5.86667E+00	4.31326E-01	4.31138E-01	0.00000E+00	1.27505E-02	6.30280E-02	0.00000E+00	-6.30280E-02	0.00000E+00	0.00000E+00
5.90000E+00	4.21228E-01	4.21019E-01	0.00000E+00	1.32826E-02	6.04943E-02	0.00000E+00	-6.04943E-02	0.00000E+00	0.00000E+00
5.93333E+00	4.11465E-01	4.11252E-01	0.00000E+00	1.32480E-02	5.80643E-02	0.00000E+00	-5.80643E-02	0.00000E+00	0.00000E+00
5.96667E+00	4.02024E-01	4.01821E-01	0.00000E+00	1.27688E-02	5.57326E-02	0.00000E+00	-5.57326E-02	0.00000E+00	0.00000E+00
6.00000E+00	3.92892E-01	3.92711E-01	0.00000E+00	1.19365E-02	5.34962E-02	0.00000E+00	-5.34962E-02	0.00000E+00	0.00000E+00

1 Boat 30 mph

Request Number 3004

Target Boat Forces

Force exerted on Marker 300100 by Marker 1003001

Time	Fm	Fx	Fy	Fz	Tqm	Tqx	Tqy	Tqz
0.00000E+00	4.85967E+03	0.00000E+00	0.00000E+00	4.85967E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E-02	4.85982E+03	0.00000E+00	0.00000E+00	4.85982E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.66667E-02	4.86024E+03	0.00000E+00	0.00000E+00	4.86024E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.00000E-01	4.86086E+03	0.00000E+00	0.00000E+00	4.86086E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.33333E-01	4.86161E+03	0.00000E+00	0.00000E+00	4.86161E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
1.66667E-01	4.86245E+03	0.00000E+00	0.00000E+00	4.86245E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.00000E-01	4.86334E+03	0.00000E+00	0.00000E+00	4.86334E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.33333E-01	4.86421E+03	0.00000E+00	0.00000E+00	4.86421E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2.66667E-01	4.86505E+03	0.00000E+00	0.00000E+00	4.86505E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.00000E-01	4.86584E+03	0.00000E+00	0.00000E+00	4.86584E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E-01	4.86654E+03	0.00000E+00	0.00000E+00	4.86654E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.66667E-01	4.86716E+03	0.00000E+00	0.00000E+00	4.86716E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.00000E-01	4.86768E+03	0.00000E+00	0.00000E+00	4.86768E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.33333E-01	4.86812E+03	0.00000E+00	0.00000E+00	4.86812E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4.66667E-01	4.86846E+03	0.00000E+00	0.00000E+00	4.86846E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.00000E-01	4.86872E+03	0.00000E+00	0.00000E+00	4.86872E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.33333E-01	4.86890E+03	0.00000E+00	0.00000E+00	4.86890E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5.66667E-01	4.86902E+03	0.00000E+00	0.00000E+00	4.86902E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.00000E-01	4.86907E+03	0.00000E+00	0.00000E+00	4.86907E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6.33333E-01	4.86907E+03	0.00000E+00	0.00000E+00	4.86907E+03	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

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[illegible]





port gunwale

Displacement of Marker 20001 relative to Marker 3200

Time	Mag	X	Y	Z	Yaw	Pitch	Roll
0.00000E+00	1.38258E+02	1.38246E+02	0.00000E+00	1.85000E+00	0.00000E+00	0.00000E+00	9.00000E+01
3.33333E-02	1.36795E+02	1.36782E+02	0.00000E+00	1.86258E+00	0.00000E+00	-4.79338E-02	9.00000E+01
6.66667E-02	1.35334E+02	1.35321E+02	0.00000E+00	1.89230E+00	0.00000E+00	-1.55993E-01	9.00000E+01
1.00000E-01	1.33876E+02	1.33862E+02	0.00000E+00	1.93158E+00	0.00000E+00	-2.92789E-01	9.00000E+01
1.33333E-01	1.32418E+02	1.32403E+02	0.00000E+00	1.97548E+00	0.00000E+00	-4.40091E-01	9.00000E+01
1.66667E-01	1.30960E+02	1.30945E+02	0.00000E+00	2.02092E+00	0.00000E+00	-5.88407E-01	9.00000E+01
2.00000E-01	1.29503E+02	1.29486E+02	0.00000E+00	2.06604E+00	0.00000E+00	-7.33209E-01	9.00000E+01
2.33333E-01	1.28044E+02	1.28027E+02	0.00000E+00	2.10917E+00	0.00000E+00	-8.71037E-01	9.00000E+01
2.66667E-01	1.26586E+02	1.26569E+02	0.00000E+00	2.14945E+00	0.00000E+00	-1.00100E+00	9.00000E+01
3.00000E-01	1.25127E+02	1.25108E+02	0.00000E+00	2.18647E+00	0.00000E+00	-1.12335E+00	9.00000E+01
3.33333E-01	1.23668E+02	1.23648E+02	0.00000E+00	2.22004E+00	0.00000E+00	-1.23864E+00	9.00000E+01
3.66667E-01	1.22208E+02	1.22188E+02	0.00000E+00	2.25020E+00	0.00000E+00	-1.34755E+00	9.00000E+01
4.00000E-01	1.20748E+02	1.20727E+02	0.00000E+00	2.27706E+00	0.00000E+00	-1.45068E+00	9.00000E+01
4.33333E-01	1.19288E+02	1.19266E+02	0.00000E+00	2.30079E+00	0.00000E+00	-1.54857E+00	9.00000E+01
4.66667E-01	1.17828E+02	1.17805E+02	0.00000E+00	2.32163E+00	0.00000E+00	-1.64181E+00	9.00000E+01
5.00000E-01	1.16367E+02	1.16343E+02	0.00000E+00	2.33987E+00	0.00000E+00	-1.73090E+00	9.00000E+01
5.33333E-01	1.14906E+02	1.14882E+02	0.00000E+00	2.35580E+00	0.00000E+00	-1.81631E+00	9.00000E+01
5.66667E-01	1.13445E+02	1.13420E+02	0.00000E+00	2.36976E+00	0.00000E+00	-1.89852E+00	9.00000E+01
6.00000E-01	1.11983E+02	1.11958E+02	0.00000E+00	2.38208E+00	0.00000E+00	-1.97793E+00	9.00000E+01
6.33333E-01	1.10522E+02	1.10496E+02	0.00000E+00	2.39304E+00	0.00000E+00	-2.05485E+00	9.00000E+01
6.66667E-01	1.09060E+02	1.09034E+02	0.00000E+00	2.40293E+00	0.00000E+00	-2.12954E+00	9.00000E+01
7.00000E-01	1.07599E+02	1.07572E+02	0.00000E+00	2.41199E+00	0.00000E+00	-2.20222E+00	9.00000E+01
7.33333E-01	1.06137E+02	1.06109E+02	0.00000E+00	2.42043E+00	0.00000E+00	-2.27306E+00	9.00000E+01
7.66667E-01	1.04675E+02	1.04647E+02	0.00000E+00	2.42843E+00	0.00000E+00	-2.34219E+00	9.00000E+01
8.00000E-01	1.03213E+02	1.03184E+02	0.00000E+00	2.43615E+00	0.00000E+00	-2.40972E+00	9.00000E+01
8.33333E-01	1.01751E+02	1.01722E+02	0.00000E+00	2.44371E+00	0.00000E+00	-2.47572E+00	9.00000E+01
8.66667E-01	1.00289E+02	1.00259E+02	0.00000E+00	2.45119E+00	0.00000E+00	-2.54026E+00	9.00000E+01
9.00000E-01	9.87269E+01	9.87269E+01	0.00000E+00	2.45868E+00	0.00000E+00	-2.60337E+00	9.00000E+01
9.33333E-01	9.73335E+01	9.73335E+01	0.00000E+00	2.46620E+00	0.00000E+00	-2.66508E+00	9.00000E+01
9.66667E-01	9.59025E+01	9.58708E+01	0.00000E+00	2.47379E+00	0.00000E+00	-2.72539E+00	9.00000E+01
1.00000E+00	9.44403E+01	9.44077E+01	0.00000E+00	2.48146E+00	0.00000E+00	-2.78433E+00	9.00000E+01
1.03333E+00	9.29779E+01	9.29446E+01	0.00000E+00	2.48906E+00	0.00000E+00	-2.84191E+00	9.00000E+01
1.06667E+00	9.15155E+01	9.14815E+01	0.00000E+00	2.49631E+00	0.00000E+00	-2.89813E+00	9.00000E+01
1.10000E+00	9.00531E+01	9.00183E+01	0.00000E+00	2.50303E+00	0.00000E+00	-2.95303E+00	9.00000E+01
1.13333E+00	8.85906E+01	8.85550E+01	0.00000E+00	2.50926E+00	0.00000E+00	-3.00668E+00	9.00000E+01
1.16667E+00	8.71280E+01	8.70917E+01	0.00000E+00	2.51511E+00	0.00000E+00	-3.05912E+00	9.00000E+01
1.20000E+00	8.56654E+01	8.56283E+01	0.00000E+00	2.52073E+00	0.00000E+00	-3.11043E+00	9.00000E+01
1.23333E+00	8.42027E+01	8.41648E+01	0.00000E+00	2.52626E+00	0.00000E+00	-3.16066E+00	9.00000E+01
1.26667E+00	8.27401E+01	8.27013E+01	0.00000E+00	2.53180E+00	0.00000E+00	-3.20984E+00	9.00000E+01
1.30000E+00	8.12774E+01	8.12377E+01	0.00000E+00	2.53746E+00	0.00000E+00	-3.25799E+00	9.00000E+01
1.33333E+00	7.98146E+01	7.97741E+01	0.00000E+00	2.54333E+00	0.00000E+00	-3.30512E+00	9.00000E+01
1.36667E+00	7.83519E+01	7.83104E+01	0.00000E+00	2.54946E+00	0.00000E+00	-3.35123E+00	9.00000E+01
1.40000E+00	7.68892E+01	7.68467E+01	0.00000E+00	2.55590E+00	0.00000E+00	-3.39629E+00	9.00000E+01
1.43333E+00	7.54264E+01	7.53829E+01	0.00000E+00	2.56269E+00	0.00000E+00	-3.44030E+00	9.00000E+01
1.46667E+00	7.39636E+01	7.39190E+01	0.00000E+00	2.56983E+00	0.00000E+00	-3.48321E+00	9.00000E+01
1.50000E+00	7.25009E+01	7.24550E+01	0.00000E+00	2.57731E+00	0.00000E+00	-3.52500E+00	9.00000E+01
1.53333E+00	7.10381E+01	7.09910E+01	0.00000E+00	2.58509E+00	0.00000E+00	-3.56565E+00	9.00000E+01
1.56667E+00	6.95753E+01	6.95269E+01	0.00000E+00	2.59313E+00	0.00000E+00	-3.60512E+00	9.00000E+01

1.60000E+00	6.81125E+01	6.80628E+01	0.00000E+00	2.60135E+00	0.00000E+00	-3.64340E+00	9.00000E+01
1.63333E+00	6.66496E+01	6.65985E+01	0.00000E+00	2.60970E+00	0.00000E+00	-3.68047E+00	9.00000E+01
1.66667E+00	6.51868E+01	6.51342E+01	0.00000E+00	2.61806E+00	0.00000E+00	-3.71633E+00	9.00000E+01
1.70000E+00	6.37240E+01	6.36698E+01	0.00000E+00	2.62636E+00	0.00000E+00	-3.75098E+00	9.00000E+01
1.73333E+00	6.22611E+01	6.22054E+01	0.00000E+00	2.63449E+00	0.00000E+00	-3.78444E+00	9.00000E+01
1.76667E+00	6.07983E+01	6.07409E+01	0.00000E+00	2.64236E+00	0.00000E+00	-3.81673E+00	9.00000E+01
1.80000E+00	5.93354E+01	5.92762E+01	0.00000E+00	2.64989E+00	0.00000E+00	-3.84788E+00	9.00000E+01
1.83333E+00	5.78726E+01	5.78116E+01	0.00000E+00	2.65698E+00	0.00000E+00	-3.87795E+00	9.00000E+01
1.86667E+00	5.64098E+01	5.63468E+01	0.00000E+00	2.66357E+00	0.00000E+00	-3.90697E+00	9.00000E+01
1.90000E+00	5.49469E+01	5.48820E+01	0.00000E+00	2.66961E+00	0.00000E+00	-3.93503E+00	9.00000E+01
1.93333E+00	5.34841E+01	5.34172E+01	0.00000E+00	2.67505E+00	0.00000E+00	-3.96217E+00	9.00000E+01
1.96667E+00	5.20213E+01	5.19523E+01	0.00000E+00	2.67987E+00	0.00000E+00	-3.98847E+00	9.00000E+01
2.00000E+00	5.05586E+01	5.04873E+01	0.00000E+00	2.68406E+00	0.00000E+00	-4.01399E+00	9.00000E+01
2.03333E+00	4.90959E+01	4.90223E+01	0.00000E+00	2.68764E+00	0.00000E+00	-4.03876E+00	9.00000E+01
2.06667E+00	4.76333E+01	4.75572E+01	0.00000E+00	2.69062E+00	0.00000E+00	-4.06286E+00	9.00000E+01
2.10000E+00	4.61707E+01	4.60921E+01	0.00000E+00	2.69307E+00	0.00000E+00	-4.08635E+00	9.00000E+01
2.13333E+00	4.47083E+01	4.46270E+01	0.00000E+00	2.69503E+00	0.00000E+00	-4.10931E+00	9.00000E+01
2.16667E+00	4.32460E+01	4.31619E+01	0.00000E+00	2.69660E+00	0.00000E+00	-4.13180E+00	9.00000E+01
2.20000E+00	4.17839E+01	4.16967E+01	0.00000E+00	2.69786E+00	0.00000E+00	-4.15388E+00	9.00000E+01
2.23333E+00	4.03219E+01	4.02315E+01	0.00000E+00	2.69891E+00	0.00000E+00	-4.17560E+00	9.00000E+01
2.26667E+00	3.88601E+01	3.87662E+01	0.00000E+00	2.69966E+00	0.00000E+00	-4.19700E+00	9.00000E+01
2.30000E+00	3.73987E+01	3.73010E+01	0.00000E+00	2.70079E+00	0.00000E+00	-4.21811E+00	9.00000E+01
2.33333E+00	3.59374E+01	3.58357E+01	0.00000E+00	2.70180E+00	0.00000E+00	-4.23894E+00	9.00000E+01
2.36667E+00	3.44766E+01	3.43705E+01	0.00000E+00	2.70299E+00	0.00000E+00	-4.25949E+00	9.00000E+01
2.40000E+00	3.30161E+01	3.29052E+01	0.00000E+00	2.70444E+00	0.00000E+00	-4.27976E+00	9.00000E+01
2.43333E+00	3.15561E+01	3.14399E+01	0.00000E+00	2.70621E+00	0.00000E+00	-4.29972E+00	9.00000E+01
2.46667E+00	3.00966E+01	2.99745E+01	0.00000E+00	2.70834E+00	0.00000E+00	-4.31935E+00	9.00000E+01
2.50000E+00	2.86378E+01	2.85092E+01	0.00000E+00	2.71088E+00	0.00000E+00	-4.33862E+00	9.00000E+01
2.53333E+00	2.71796E+01	2.70438E+01	0.00000E+00	2.71383E+00	0.00000E+00	-4.35748E+00	9.00000E+01
2.56667E+00	2.57223E+01	2.55784E+01	0.00000E+00	2.71719E+00	0.00000E+00	-4.37589E+00	9.00000E+01
2.60000E+00	2.42659E+01	2.41129E+01	0.00000E+00	2.72091E+00	0.00000E+00	-4.39380E+00	9.00000E+01
2.63333E+00	2.28108E+01	2.26474E+01	0.00000E+00	2.72498E+00	0.00000E+00	-4.41118E+00	9.00000E+01
2.66667E+00	2.13570E+01	2.11819E+01	0.00000E+00	2.72934E+00	0.00000E+00	-4.42798E+00	9.00000E+01
2.70000E+00	1.99050E+01	1.97163E+01	0.00000E+00	2.73392E+00	0.00000E+00	-4.44419E+00	9.00000E+01
2.73333E+00	1.84551E+01	1.82507E+01	0.00000E+00	2.73863E+00	0.00000E+00	-4.45975E+00	9.00000E+01
2.76667E+00	1.70078E+01	1.67851E+01	0.00000E+00	2.74340E+00	0.00000E+00	-4.47468E+00	9.00000E+01
2.80000E+00	1.55639E+01	1.53194E+01	0.00000E+00	2.74812E+00	0.00000E+00	-4.48894E+00	9.00000E+01
2.83333E+00	1.41245E+01	1.38537E+01	0.00000E+00	2.75271E+00	0.00000E+00	-4.50255E+00	9.00000E+01
2.86667E+00	1.26910E+01	1.23879E+01	0.00000E+00	2.75708E+00	0.00000E+00	-4.51553E+00	9.00000E+01
2.90000E+00	1.12657E+01	1.09221E+01	0.00000E+00	2.76115E+00	0.00000E+00	-4.52788E+00	9.00000E+01
2.93333E+00	9.85212E+00	9.45621E+00	0.00000E+00	2.76485E+00	0.00000E+00	-4.53965E+00	9.00000E+01
2.96667E+00	8.45621E+00	7.99031E+00	0.00000E+00	2.76812E+00	0.00000E+00	-4.55087E+00	9.00000E+01
3.00000E+00	7.08840E+00	6.52438E+00	0.00000E+00	2.77092E+00	0.00000E+00	-4.56159E+00	9.00000E+01
3.03333E+00	5.76873E+00	5.05842E+00	0.00000E+00	2.77320E+00	0.00000E+00	-4.57187E+00	9.00000E+01
3.06667E+00	4.53939E+00	3.59243E+00	0.00000E+00	2.77497E+00	0.00000E+00	-4.58176E+00	9.00000E+01
3.10000E+00	3.49702E+00	2.12642E+00	0.00000E+00	2.77623E+00	0.00000E+00	-4.59133E+00	9.00000E+01
3.13333E+00	2.85721E+00	6.62362E-01	0.00000E+00	2.77937E+00	0.00000E+00	-4.60579E+00	9.00000E+01
3.16667E+00	2.93126E+00	-7.58942E-01	0.00000E+00	2.83131E+00	0.00000E+00	-4.71147E+00	9.00000E+01
3.20000E+00	3.59922E+00	-2.18031E+00	0.00000E+00	2.86368E+00	0.00000E+00	-4.74291E+00	9.00000E+01
3.23333E+00	4.61145E+00	-3.61242E+00	0.00000E+00	2.86635E+00	0.00000E+00	-4.70954E+00	9.00000E+01
3.26667E+00	5.79666E+00	-5.03869E+00	0.00000E+00	2.86581E+00	0.00000E+00	-4.68547E+00	9.00000E+01
3.30000E+00	7.06216E+00	-6.45398E+00	0.00000E+00	2.86709E+00	0.00000E+00	-4.70092E+00	9.00000E+01
3.33333E+00	8.27250E+00	-7.71936E+00	0.00000E+00	2.97419E+00	0.00000E+00	-6.03910E+00	9.00000E+01
3.36667E+00	9.25055E+00	-8.60199E+00	0.00000E+00	3.40271E+00	0.00000E+00	-1.12162E+01	9.00000E+01

## boat30.out

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3.40000E+00	1.00743E+01	-9.23124E+00	0.00000E+00	4.03442E+00	0.00000E+00	-1.89897E+01	9.00000E+01
3.43333E+00	1.08751E+01	-9.88152E+00	0.00000E+00	4.54137E+00	0.00000E+00	-2.56629E+01	9.00000E+01
3.46667E+00	1.16946E+01	-1.06262E+01	0.00000E+00	4.88336E+00	0.00000E+00	-3.04751E+01	9.00000E+01
3.50000E+00	1.25348E+01	-1.14422E+01	0.00000E+00	5.11843E+00	0.00000E+00	-3.39278E+01	9.00000E+01
3.53333E+00	1.33962E+01	-1.23110E+01	0.00000E+00	5.28185E+00	0.00000E+00	-3.63619E+01	9.00000E+01
3.56667E+00	1.42861E+01	-1.32259E+01	0.00000E+00	5.40064E+00	0.00000E+00	-3.78797E+01	9.00000E+01
3.60000E+00	1.52119E+01	-1.41832E+01	0.00000E+00	5.49880E+00	0.00000E+00	-3.85228E+01	9.00000E+01
3.63333E+00	1.61766E+01	-1.51798E+01	0.00000E+00	5.59078E+00	0.00000E+00	-3.83880E+01	9.00000E+01
3.66667E+00	1.71591E+01	-1.61974E+01	0.00000E+00	5.66404E+00	0.00000E+00	-3.78771E+01	9.00000E+01
3.70000E+00	1.81373E+01	-1.72176E+01	0.00000E+00	5.70235E+00	0.00000E+00	-3.72916E+01	9.00000E+01
3.73333E+00	1.91094E+01	-1.82389E+01	0.00000E+00	5.70189E+00	0.00000E+00	-3.66581E+01	9.00000E+01
3.76667E+00	2.00782E+01	-1.92625E+01	0.00000E+00	5.66472E+00	0.00000E+00	-3.59659E+01	9.00000E+01
3.80000E+00	2.10449E+01	-2.02878E+01	0.00000E+00	5.59376E+00	0.00000E+00	-3.52284E+01	9.00000E+01
3.83333E+00	2.20093E+01	-2.13133E+01	0.00000E+00	5.49122E+00	0.00000E+00	-3.44785E+01	9.00000E+01
3.86667E+00	2.29712E+01	-2.23377E+01	0.00000E+00	5.35735E+00	0.00000E+00	-3.38717E+01	9.00000E+01
3.90000E+00	2.39405E+01	-2.33686E+01	0.00000E+00	5.20163E+00	0.00000E+00	-3.34803E+01	9.00000E+01
3.93333E+00	2.49191E+01	-2.44058E+01	0.00000E+00	5.03207E+00	0.00000E+00	-3.31383E+01	9.00000E+01
3.96667E+00	2.59046E+01	-2.54476E+01	0.00000E+00	4.84449E+00	0.00000E+00	-3.27476E+01	9.00000E+01
4.00000E+00	2.68969E+01	-2.64948E+01	0.00000E+00	4.63351E+00	0.00000E+00	-3.23045E+01	9.00000E+01
4.03333E+00	2.78993E+01	-2.75475E+01	0.00000E+00	4.41601E+00	0.00000E+00	-3.18137E+01	9.00000E+01
4.06667E+00	2.89143E+01	-2.86060E+01	0.00000E+00	4.21077E+00	0.00000E+00	-3.12828E+01	9.00000E+01
4.10000E+00	2.99412E+01	-2.96699E+01	0.00000E+00	4.02111E+00	0.00000E+00	-3.07180E+01	9.00000E+01
4.13333E+00	3.09787E+01	-3.07389E+01	0.00000E+00	3.84673E+00	0.00000E+00	-3.01251E+01	9.00000E+01
4.16667E+00	3.20255E+01	-3.18126E+01	0.00000E+00	3.68708E+00	0.00000E+00	-2.95104E+01	9.00000E+01
4.20000E+00	3.30806E+01	-3.28904E+01	0.00000E+00	3.54195E+00	0.00000E+00	-2.88785E+01	9.00000E+01
4.23333E+00	3.41429E+01	-3.39721E+01	0.00000E+00	3.41129E+00	0.00000E+00	-2.82344E+01	9.00000E+01
4.26667E+00	3.52116E+01	-3.50571E+01	0.00000E+00	3.29509E+00	0.00000E+00	-2.75827E+01	9.00000E+01
4.30000E+00	3.62858E+01	-3.61450E+01	0.00000E+00	3.19335E+00	0.00000E+00	-2.69281E+01	9.00000E+01
4.33333E+00	3.73647E+01	-3.72354E+01	0.00000E+00	3.10599E+00	0.00000E+00	-2.62745E+01	9.00000E+01
4.36667E+00	3.84476E+01	-3.83278E+01	0.00000E+00	3.03274E+00	0.00000E+00	-2.56258E+01	9.00000E+01
4.40000E+00	3.95340E+01	-3.94221E+01	0.00000E+00	2.97330E+00	0.00000E+00	-2.49842E+01	9.00000E+01
4.43333E+00	4.06234E+01	-4.05178E+01	0.00000E+00	2.92699E+00	0.00000E+00	-2.43532E+01	9.00000E+01
4.46667E+00	4.17152E+01	-4.16148E+01	0.00000E+00	2.89288E+00	0.00000E+00	-2.37353E+01	9.00000E+01
4.50000E+00	4.28090E+01	-4.27127E+01	0.00000E+00	2.86982E+00	0.00000E+00	-2.31320E+01	9.00000E+01
4.53333E+00	4.39046E+01	-4.38116E+01	0.00000E+00	2.85653E+00	0.00000E+00	-2.25444E+01	9.00000E+01
4.56667E+00	4.50017E+01	-4.49112E+01	0.00000E+00	2.85166E+00	0.00000E+00	-2.19731E+01	9.00000E+01
4.60000E+00	4.61000E+01	-4.60116E+01	0.00000E+00	2.85383E+00	0.00000E+00	-2.14184E+01	9.00000E+01
4.63333E+00	4.71995E+01	-4.71127E+01	0.00000E+00	2.86172E+00	0.00000E+00	-2.08805E+01	9.00000E+01
4.66667E+00	4.83000E+01	-4.82144E+01	0.00000E+00	2.87403E+00	0.00000E+00	-2.03591E+01	9.00000E+01
4.70000E+00	4.94014E+01	-4.93168E+01	0.00000E+00	2.88957E+00	0.00000E+00	-1.98540E+01	9.00000E+01
4.73333E+00	5.05035E+01	-5.04198E+01	0.00000E+00	2.90728E+00	0.00000E+00	-1.93648E+01	9.00000E+01
4.76667E+00	5.16064E+01	-5.15234E+01	0.00000E+00	2.92623E+00	0.00000E+00	-1.88911E+01	9.00000E+01
4.80000E+00	5.27099E+01	-5.26276E+01	0.00000E+00	2.94563E+00	0.00000E+00	-1.84325E+01	9.00000E+01
4.83333E+00	5.38141E+01	-5.37323E+01	0.00000E+00	2.96479E+00	0.00000E+00	-1.79885E+01	9.00000E+01
4.86667E+00	5.49187E+01	-5.48377E+01	0.00000E+00	2.98322E+00	0.00000E+00	-1.75589E+01	9.00000E+01
4.90000E+00	5.60240E+01	-5.59433E+01	0.00000E+00	3.00052E+00	0.00000E+00	-1.71432E+01	9.00000E+01
4.93333E+00	5.71297E+01	-5.70500E+01	0.00000E+00	3.01640E+00	0.00000E+00	-1.67410E+01	9.00000E+01
4.96667E+00	5.82358E+01	-5.81569E+01	0.00000E+00	3.03067E+00	0.00000E+00	-1.63519E+01	9.00000E+01
5.00000E+00	5.93424E+01	-5.92643E+01	0.00000E+00	3.04321E+00	0.00000E+00	-1.59756E+01	9.00000E+01
5.03333E+00	6.04495E+01	-6.03723E+01	0.00000E+00	3.05398E+00	0.00000E+00	-1.56116E+01	9.00000E+01
5.06667E+00	6.15569E+01	-6.14807E+01	0.00000E+00	3.06300E+00	0.00000E+00	-1.52598E+01	9.00000E+01
5.10000E+00	6.26648E+01	-6.25895E+01	0.00000E+00	3.07032E+00	0.00000E+00	-1.49196E+01	9.00000E+01
5.13333E+00	6.37731E+01	-6.36988E+01	0.00000E+00	3.07604E+00	0.00000E+00	-1.45907E+01	9.00000E+01
5.16667E+00	6.48817E+01	-6.48086E+01	0.00000E+00	3.08029E+00	0.00000E+00	-1.42729E+01	9.00000E+01



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[illegible]



0.00000E+00	1.39020E+02	1.39019E+02	0.00000E+00	3.85000E-01	0.00000E+00	0.00000E+00	9.00000E+01
3.33333E-02	1.37554E+02	1.37554E+02	0.00000E+00	3.96936E-01	0.00000E+00	-4.79338E-02	9.00000E+01
6.66667E-02	1.36091E+02	1.36090E+02	0.00000E+00	4.25202E-01	0.00000E+00	-1.55993E-01	9.00000E+01
1.00000E-01	1.34628E+02	1.34627E+02	0.00000E+00	4.62544E-01	0.00000E+00	-2.92789E-01	9.00000E+01
1.33333E-01	1.33166E+02	1.33165E+02	0.00000E+00	5.04582E-01	0.00000E+00	-4.40091E-01	9.00000E+01
1.66667E-01	1.31704E+02	1.31703E+02	0.00000E+00	5.48054E-01	0.00000E+00	-5.88407E-01	9.00000E+01
2.00000E-01	1.30242E+02	1.30240E+02	0.00000E+00	5.91272E-01	0.00000E+00	-7.33209E-01	9.00000E+01
2.33333E-01	1.28779E+02	1.28778E+02	0.00000E+00	6.32593E-01	0.00000E+00	-8.71037E-01	9.00000E+01
2.66667E-01	1.27317E+02	1.27315E+02	0.00000E+00	6.71169E-01	0.00000E+00	-1.00100E+00	9.00000E+01
3.00000E-01	1.25854E+02	1.25852E+02	0.00000E+00	7.06600E-01	0.00000E+00	-1.12335E+00	9.00000E+01
3.33333E-01	1.24391E+02	1.24389E+02	0.00000E+00	7.38674E-01	0.00000E+00	-1.23864E+00	9.00000E+01
3.66667E-01	1.22928E+02	1.22926E+02	0.00000E+00	7.67431E-01	0.00000E+00	-1.34755E+00	9.00000E+01
4.00000E-01	1.21465E+02	1.21463E+02	0.00000E+00	7.92960E-01	0.00000E+00	-1.45068E+00	9.00000E+01
4.33333E-01	1.20002E+02	1.19999E+02	0.00000E+00	8.15433E-01	0.00000E+00	-1.54857E+00	9.00000E+01
4.66667E-01	1.18538E+02	1.18536E+02	0.00000E+00	8.35087E-01	0.00000E+00	-1.64181E+00	9.00000E+01
5.00000E-01	1.17075E+02	1.17072E+02	0.00000E+00	8.52194E-01	0.00000E+00	-1.73090E+00	9.00000E+01
5.33333E-01	1.15611E+02	1.15608E+02	0.00000E+00	8.67036E-01	0.00000E+00	-1.81631E+00	9.00000E+01
5.66667E-01	1.14148E+02	1.14144E+02	0.00000E+00	8.79956E-01	0.00000E+00	-1.89852E+00	9.00000E+01
6.00000E-01	1.12684E+02	1.12680E+02	0.00000E+00	8.91270E-01	0.00000E+00	-1.97793E+00	9.00000E+01
6.33333E-01	1.11220E+02	1.11216E+02	0.00000E+00	9.01267E-01	0.00000E+00	-2.05485E+00	9.00000E+01
6.66667E-01	1.09756E+02	1.09752E+02	0.00000E+00	9.10216E-01	0.00000E+00	-2.12954E+00	9.00000E+01
7.00000E-01	1.08292E+02	1.08288E+02	0.00000E+00	9.18366E-01	0.00000E+00	-2.20222E+00	9.00000E+01
7.33333E-01	1.06828E+02	1.06824E+02	0.00000E+00	9.25923E-01	0.00000E+00	-2.27306E+00	9.00000E+01
7.66667E-01	1.05364E+02	1.05359E+02	0.00000E+00	9.33067E-01	0.00000E+00	-2.34219E+00	9.00000E+01
8.00000E-01	1.03899E+02	1.03895E+02	0.00000E+00	9.39949E-01	0.00000E+00	-2.40972E+00	9.00000E+01
8.33333E-01	1.02435E+02	1.02431E+02	0.00000E+00	9.46686E-01	0.00000E+00	-2.47572E+00	9.00000E+01
8.66667E-01	1.00971E+02	1.00966E+02	0.00000E+00	9.53373E-01	0.00000E+00	-2.54026E+00	9.00000E+01
9.00000E-01	9.95067E+01	9.95020E+01	0.00000E+00	9.60078E-01	0.00000E+00	-2.60337E+00	9.00000E+01
9.33333E-01	9.80423E+01	9.80376E+01	0.00000E+00	9.66844E-01	0.00000E+00	-2.66508E+00	9.00000E+01
9.66667E-01	9.65780E+01	9.65731E+01	0.00000E+00	9.73696E-01	0.00000E+00	-2.72539E+00	9.00000E+01
1.00000E+00	9.51136E+01	9.51086E+01	0.00000E+00	9.80644E-01	0.00000E+00	-2.78433E+00	9.00000E+01
1.03333E+00	9.36440E+01	9.36440E+01	0.00000E+00	9.87534E-01	0.00000E+00	-2.84191E+00	9.00000E+01
1.06667E+00	9.21848E+01	9.21794E+01	0.00000E+00	9.94057E-01	0.00000E+00	-2.89813E+00	9.00000E+01
1.10000E+00	9.07203E+01	9.07148E+01	0.00000E+00	1.00015E+00	0.00000E+00	-2.95303E+00	9.00000E+01
1.13333E+00	8.92558E+01	8.92501E+01	0.00000E+00	1.00573E+00	0.00000E+00	-3.00668E+00	9.00000E+01
1.16667E+00	8.77912E+01	8.77854E+01	0.00000E+00	1.01094E+00	0.00000E+00	-3.05912E+00	9.00000E+01
1.20000E+00	8.63266E+01	8.63207E+01	0.00000E+00	1.01594E+00	0.00000E+00	-3.11043E+00	9.00000E+01
1.23333E+00	8.48620E+01	8.48559E+01	0.00000E+00	1.02086E+00	0.00000E+00	-3.16066E+00	9.00000E+01
1.26667E+00	8.33974E+01	8.33911E+01	0.00000E+00	1.02582E+00	0.00000E+00	-3.20984E+00	9.00000E+01
1.30000E+00	8.19372E+01	8.19262E+01	0.00000E+00	1.03090E+00	0.00000E+00	-3.25799E+00	9.00000E+01
1.33333E+00	8.04680E+01	8.04614E+01	0.00000E+00	1.03620E+00	0.00000E+00	-3.30512E+00	9.00000E+01
1.36667E+00	7.90033E+01	7.89965E+01	0.00000E+00	1.04177E+00	0.00000E+00	-3.35123E+00	9.00000E+01
1.40000E+00	7.75386E+01	7.75315E+01	0.00000E+00	1.04768E+00	0.00000E+00	-3.39629E+00	9.00000E+01
1.43333E+00	7.60738E+01	7.60665E+01	0.00000E+00	1.05394E+00	0.00000E+00	-3.44030E+00	9.00000E+01
1.46667E+00	7.46091E+01	7.46015E+01	0.00000E+00	1.06057E+00	0.00000E+00	-3.48321E+00	9.00000E+01
1.50000E+00	7.31443E+01	7.31365E+01	0.00000E+00	1.06755E+00	0.00000E+00	-3.52500E+00	9.00000E+01
1.53333E+00	7.16795E+01	7.16714E+01	0.00000E+00	1.07485E+00	0.00000E+00	-3.56565E+00	9.00000E+01
1.56667E+00	7.02146E+01	7.02063E+01	0.00000E+00	1.08242E+00	0.00000E+00	-3.60512E+00	9.00000E+01
1.60000E+00	6.87498E+01	6.87411E+01	0.00000E+00	1.09019E+00	0.00000E+00	-3.64340E+00	9.00000E+01
1.63333E+00	6.72849E+01	6.72759E+01	0.00000E+00	1.09810E+00	0.00000E+00	-3.68047E+00	9.00000E+01
1.66667E+00	6.58199E+01	6.58106E+01	0.00000E+00	1.10604E+00	0.00000E+00	-3.71633E+00	9.00000E+01
1.70000E+00	6.43550E+01	6.43453E+01	0.00000E+00	1.11393E+00	0.00000E+00	-3.75098E+00	9.00000E+01
1.73333E+00	6.28900E+01	6.28800E+01	0.00000E+00	1.12167E+00	0.00000E+00	-3.78444E+00	9.00000E+01
1.76667E+00	6.14250E+01	6.14146E+01	0.00000E+00	1.12916E+00	0.00000E+00	-3.81673E+00	9.00000E+01



1.80000E+00	5.99600E+01	5.99492E+01	0.00000E+00	1.13631E+00	0.00000E+00	-3.84788E+00	9.00000E+01
1.83333E+00	5.84949E+01	5.84837E+01	0.00000E+00	1.14305E+00	0.00000E+00	-3.87795E+00	9.00000E+01
1.86667E+00	5.70298E+01	5.70182E+01	0.00000E+00	1.14931E+00	0.00000E+00	-3.90697E+00	9.00000E+01
1.90000E+00	5.55647E+01	5.55527E+01	0.00000E+00	1.15501E+00	0.00000E+00	-3.93503E+00	9.00000E+01
1.93333E+00	5.40995E+01	5.40871E+01	0.00000E+00	1.16013E+00	0.00000E+00	-3.96217E+00	9.00000E+01
1.96667E+00	5.26344E+01	5.26215E+01	0.00000E+00	1.16465E+00	0.00000E+00	-3.98847E+00	9.00000E+01
2.00000E+00	5.11692E+01	5.11559E+01	0.00000E+00	1.16855E+00	0.00000E+00	-4.01399E+00	9.00000E+01
2.03333E+00	4.97040E+01	4.96902E+01	0.00000E+00	1.17183E+00	0.00000E+00	-4.03876E+00	9.00000E+01
2.06667E+00	4.82388E+01	4.82245E+01	0.00000E+00	1.17454E+00	0.00000E+00	-4.06286E+00	9.00000E+01
2.10000E+00	4.67736E+01	4.67588E+01	0.00000E+00	1.17671E+00	0.00000E+00	-4.08635E+00	9.00000E+01
2.13333E+00	4.53084E+01	4.52930E+01	0.00000E+00	1.17841E+00	0.00000E+00	-4.10931E+00	9.00000E+01
2.16667E+00	4.38432E+01	4.38273E+01	0.00000E+00	1.17971E+00	0.00000E+00	-4.13180E+00	9.00000E+01
2.20000E+00	4.23780E+01	4.23615E+01	0.00000E+00	1.18072E+00	0.00000E+00	-4.15388E+00	9.00000E+01
2.23333E+00	4.09128E+01	4.08957E+01	0.00000E+00	1.18152E+00	0.00000E+00	-4.17560E+00	9.00000E+01
2.26667E+00	3.94477E+01	3.94300E+01	0.00000E+00	1.18221E+00	0.00000E+00	-4.19700E+00	9.00000E+01
2.30000E+00	3.79826E+01	3.79642E+01	0.00000E+00	1.18290E+00	0.00000E+00	-4.21811E+00	9.00000E+01
2.33333E+00	3.65175E+01	3.64983E+01	0.00000E+00	1.18367E+00	0.00000E+00	-4.23894E+00	9.00000E+01
2.36667E+00	3.50325E+01	3.50325E+01	0.00000E+00	1.18463E+00	0.00000E+00	-4.25949E+00	9.00000E+01
2.40000E+00	3.35876E+01	3.35667E+01	0.00000E+00	1.18584E+00	0.00000E+00	-4.27976E+00	9.00000E+01
2.43333E+00	3.21228E+01	3.21008E+01	0.00000E+00	1.18738E+00	0.00000E+00	-4.29972E+00	9.00000E+01
2.46667E+00	3.06581E+01	3.06350E+01	0.00000E+00	1.18929E+00	0.00000E+00	-4.31935E+00	9.00000E+01
2.50000E+00	2.91934E+01	2.91691E+01	0.00000E+00	1.19160E+00	0.00000E+00	-4.33862E+00	9.00000E+01
2.53333E+00	2.77290E+01	2.77032E+01	0.00000E+00	1.19433E+00	0.00000E+00	-4.35748E+00	9.00000E+01
2.56667E+00	2.62646E+01	2.62373E+01	0.00000E+00	1.19747E+00	0.00000E+00	-4.37589E+00	9.00000E+01
2.60000E+00	2.48005E+01	2.47714E+01	0.00000E+00	1.20099E+00	0.00000E+00	-4.39380E+00	9.00000E+01
2.63333E+00	2.33366E+01	2.33055E+01	0.00000E+00	1.20487E+00	0.00000E+00	-4.41118E+00	9.00000E+01
2.66667E+00	2.18729E+01	2.18395E+01	0.00000E+00	1.20903E+00	0.00000E+00	-4.42798E+00	9.00000E+01
2.70000E+00	2.04096E+01	2.03735E+01	0.00000E+00	1.21343E+00	0.00000E+00	-4.44419E+00	9.00000E+01
2.73333E+00	1.89467E+01	1.89075E+01	0.00000E+00	1.21796E+00	0.00000E+00	-4.45975E+00	9.00000E+01
2.76667E+00	1.74842E+01	1.74414E+01	0.00000E+00	1.22255E+00	0.00000E+00	-4.47468E+00	9.00000E+01
2.80000E+00	1.60224E+01	1.59754E+01	0.00000E+00	1.22711E+00	0.00000E+00	-4.48894E+00	9.00000E+01
2.83333E+00	1.45614E+01	1.45093E+01	0.00000E+00	1.23155E+00	0.00000E+00	-4.50255E+00	9.00000E+01
2.86667E+00	1.31016E+01	1.30431E+01	0.00000E+00	1.23577E+00	0.00000E+00	-4.51553E+00	9.00000E+01
2.90000E+00	1.16432E+01	1.15770E+01	0.00000E+00	1.23970E+00	0.00000E+00	-4.52788E+00	9.00000E+01
2.93333E+00	1.01870E+01	1.01108E+01	0.00000E+00	1.24327E+00	0.00000E+00	-4.53965E+00	9.00000E+01
2.96667E+00	8.73403E+00	8.64463E+00	0.00000E+00	1.24641E+00	0.00000E+00	-4.55087E+00	9.00000E+01
3.00000E+00	7.28628E+00	7.17842E+00	0.00000E+00	1.24908E+00	0.00000E+00	-4.56159E+00	9.00000E+01
3.03333E+00	5.84762E+00	5.71218E+00	0.00000E+00	1.25125E+00	0.00000E+00	-4.57187E+00	9.00000E+01
3.06667E+00	4.42693E+00	4.24593E+00	0.00000E+00	1.25291E+00	0.00000E+00	-4.58176E+00	9.00000E+01
3.10000E+00	3.04946E+00	2.77967E+00	0.00000E+00	1.25406E+00	0.00000E+00	-4.59133E+00	9.00000E+01
3.13333E+00	1.81925E+00	1.31515E+00	0.00000E+00	1.25700E+00	0.00000E+00	-4.60579E+00	9.00000E+01
3.16667E+00	1.31169E+00	-1.10653E-01	0.00000E+00	1.30701E+00	0.00000E+00	-4.71147E+00	9.00000E+01
3.20000E+00	2.03600E+00	-1.53423E+00	0.00000E+00	1.33845E+00	0.00000E+00	-4.74291E+00	9.00000E+01
3.23333E+00	3.25513E+00	-2.96594E+00	0.00000E+00	1.34128E+00	0.00000E+00	-4.70954E+00	9.00000E+01
3.26667E+00	4.59201E+00	-4.39187E+00	0.00000E+00	1.34088E+00	0.00000E+00	-4.68547E+00	9.00000E+01
3.30000E+00	5.96042E+00	-5.80736E+00	0.00000E+00	1.34208E+00	0.00000E+00	-4.70092E+00	9.00000E+01
3.33333E+00	7.23233E+00	-7.08686E+00	0.00000E+00	1.44328E+00	0.00000E+00	-6.03910E+00	9.00000E+01
3.36667E+00	8.23176E+00	-8.02082E+00	0.00000E+00	1.85158E+00	0.00000E+00	-1.12162E+01	9.00000E+01
3.40000E+00	9.05860E+00	-8.71835E+00	0.00000E+00	2.45939E+00	0.00000E+00	-1.89897E+01	9.00000E+01
3.43333E+00	9.86637E+00	-9.41434E+00	0.00000E+00	2.95219E+00	0.00000E+00	-2.56629E+01	9.00000E+01
3.46667E+00	1.06993E+01	-1.01817E+01	0.00000E+00	3.28769E+00	0.00000E+00	-3.04751E+01	9.00000E+01
3.50000E+00	1.15571E+01	-1.10080E+01	0.00000E+00	3.51990E+00	0.00000E+00	-3.39278E+01	9.00000E+01
3.53333E+00	1.24386E+01	-1.18811E+01	0.00000E+00	3.68218E+00	0.00000E+00	-3.63619E+01	9.00000E+01
3.56667E+00	1.33489E+01	-1.27963E+01	0.00000E+00	3.80090E+00	0.00000E+00	-3.78797E+01	9.00000E+01

3.60000E+00	1.42931E+01	-1.37508E+01	0.00000E+00	3.89981E+00	0.00000E+00	-3.85228E+01	9.00000E+01
3.63333E+00	1.52736E+01	-1.47424E+01	0.00000E+00	3.93315E+00	0.00000E+00	-3.83880E+01	9.00000E+01
3.66667E+00	1.62722E+01	-1.57556E+01	0.00000E+00	4.06761E+00	0.00000E+00	-3.78771E+01	9.00000E+01
3.70000E+00	1.72689E+01	-1.67735E+01	0.00000E+00	4.10556E+00	0.00000E+00	-3.72916E+01	9.00000E+01
3.73333E+00	1.82615E+01	-1.77939E+01	0.00000E+00	4.16538E+00	0.00000E+00	-3.66581E+01	9.00000E+01
3.76667E+00	1.92519E+01	-1.88169E+01	0.00000E+00	4.06935E+00	0.00000E+00	-3.59659E+01	9.00000E+01
3.80000E+00	2.02408E+01	-1.98420E+01	0.00000E+00	3.99847E+00	0.00000E+00	-3.52284E+01	9.00000E+01
3.83333E+00	2.12276E+01	-2.08670E+01	0.00000E+00	3.89604E+00	0.00000E+00	-3.44785E+01	9.00000E+01
3.86667E+00	2.22098E+01	-2.18887E+01	0.00000E+00	3.76292E+00	0.00000E+00	-3.38717E+01	9.00000E+01
3.90000E+00	2.31977E+01	-2.29153E+01	0.00000E+00	3.60842E+00	0.00000E+00	-3.34803E+01	9.00000E+01
3.93333E+00	2.41953E+01	-2.39496E+01	0.00000E+00	3.43971E+00	0.00000E+00	-3.31383E+01	9.00000E+01
3.96667E+00	2.52007E+01	-2.49899E+01	0.00000E+00	3.25254E+00	0.00000E+00	-3.27476E+01	9.00000E+01
4.00000E+00	2.62133E+01	-2.60362E+01	0.00000E+00	3.04181E+00	0.00000E+00	-3.23045E+01	9.00000E+01
4.03333E+00	2.72353E+01	-2.70884E+01	0.00000E+00	2.82449E+00	0.00000E+00	-3.18137E+01	9.00000E+01
4.06667E+00	2.82678E+01	-2.81462E+01	0.00000E+00	2.61945E+00	0.00000E+00	-3.12828E+01	9.00000E+01
4.10000E+00	2.93100E+01	-2.92091E+01	0.00000E+00	2.43008E+00	0.00000E+00	-3.07180E+01	9.00000E+01
4.13333E+00	3.03607E+01	-3.02767E+01	0.00000E+00	2.25609E+00	0.00000E+00	-3.01251E+01	9.00000E+01
4.16667E+00	3.14187E+01	-3.13486E+01	0.00000E+00	2.09695E+00	0.00000E+00	-2.95104E+01	9.00000E+01
4.20000E+00	3.24831E+01	-3.24244E+01	0.00000E+00	1.95244E+00	0.00000E+00	-2.88785E+01	9.00000E+01
4.23333E+00	3.35531E+01	-3.35036E+01	0.00000E+00	1.82250E+00	0.00000E+00	-2.82344E+01	9.00000E+01
4.26667E+00	3.46279E+01	-3.45858E+01	0.00000E+00	1.70712E+00	0.00000E+00	-2.75827E+01	9.00000E+01
4.30000E+00	3.57089E+01	-3.56707E+01	0.00000E+00	1.60628E+00	0.00000E+00	-2.69281E+01	9.00000E+01
4.33333E+00	3.67893E+01	-3.67579E+01	0.00000E+00	1.51986E+00	0.00000E+00	-2.62745E+01	9.00000E+01
4.36667E+00	3.78748E+01	-3.78471E+01	0.00000E+00	1.44761E+00	0.00000E+00	-2.56258E+01	9.00000E+01
4.40000E+00	3.89628E+01	-3.89380E+01	0.00000E+00	1.38918E+00	0.00000E+00	-2.49842E+01	9.00000E+01
4.43333E+00	4.00530E+01	-4.00305E+01	0.00000E+00	1.34388E+00	0.00000E+00	-2.43532E+01	9.00000E+01
4.46667E+00	4.11450E+01	-4.11241E+01	0.00000E+00	1.31078E+00	0.00000E+00	-2.37353E+01	9.00000E+01
4.50000E+00	4.22385E+01	-4.22189E+01	0.00000E+00	1.28872E+00	0.00000E+00	-2.31320E+01	9.00000E+01
4.53333E+00	4.33344E+01	-4.33146E+01	0.00000E+00	1.27641E+00	0.00000E+00	-2.25444E+01	9.00000E+01
4.56667E+00	4.44294E+01	-4.44112E+01	0.00000E+00	1.27250E+00	0.00000E+00	-2.19731E+01	9.00000E+01
4.60000E+00	4.55265E+01	-4.55086E+01	0.00000E+00	1.27562E+00	0.00000E+00	-2.14184E+01	9.00000E+01
4.63333E+00	4.66245E+01	-4.66068E+01	0.00000E+00	1.28442E+00	0.00000E+00	-2.08805E+01	9.00000E+01
4.66667E+00	4.77234E+01	-4.77057E+01	0.00000E+00	1.29763E+00	0.00000E+00	-2.03591E+01	9.00000E+01
4.70000E+00	4.88230E+01	-4.88054E+01	0.00000E+00	1.31407E+00	0.00000E+00	-1.98540E+01	9.00000E+01
4.73333E+00	4.99234E+01	-4.99057E+01	0.00000E+00	1.33266E+00	0.00000E+00	-1.93648E+01	9.00000E+01
4.76667E+00	5.10245E+01	-5.10066E+01	0.00000E+00	1.35247E+00	0.00000E+00	-1.88911E+01	9.00000E+01
4.80000E+00	5.21263E+01	-5.21082E+01	0.00000E+00	1.37273E+00	0.00000E+00	-1.84325E+01	9.00000E+01
4.83333E+00	5.32286E+01	-5.32104E+01	0.00000E+00	1.39273E+00	0.00000E+00	-1.79885E+01	9.00000E+01
4.86667E+00	5.43316E+01	-5.43132E+01	0.00000E+00	1.41200E+00	0.00000E+00	-1.75589E+01	9.00000E+01
4.90000E+00	5.54351E+01	-5.54166E+01	0.00000E+00	1.43014E+00	0.00000E+00	-1.71432E+01	9.00000E+01
4.93333E+00	5.65391E+01	-5.65206E+01	0.00000E+00	1.44685E+00	0.00000E+00	-1.67410E+01	9.00000E+01
4.96667E+00	5.76436E+01	-5.76251E+01	0.00000E+00	1.46194E+00	0.00000E+00	-1.63519E+01	9.00000E+01
5.00000E+00	5.87487E+01	-5.87301E+01	0.00000E+00	1.47529E+00	0.00000E+00	-1.59756E+01	9.00000E+01
5.03333E+00	5.98542E+01	-5.98357E+01	0.00000E+00	1.48686E+00	0.00000E+00	-1.56116E+01	9.00000E+01
5.06667E+00	6.09602E+01	-6.09418E+01	0.00000E+00	1.49668E+00	0.00000E+00	-1.52598E+01	9.00000E+01
5.10000E+00	6.20666E+01	-6.20484E+01	0.00000E+00	1.50479E+00	0.00000E+00	-1.49196E+01	9.00000E+01
5.13333E+00	6.31735E+01	-6.31554E+01	0.00000E+00	1.51130E+00	0.00000E+00	-1.45907E+01	9.00000E+01
5.16667E+00	6.42808E+01	-6.42629E+01	0.00000E+00	1.51631E+00	0.00000E+00	-1.42729E+01	9.00000E+01
5.20000E+00	6.53886E+01	-6.53709E+01	0.00000E+00	1.51997E+00	0.00000E+00	-1.39657E+01	9.00000E+01
5.23333E+00	6.64967E+01	-6.64793E+01	0.00000E+00	1.52243E+00	0.00000E+00	-1.36689E+01	9.00000E+01
5.26667E+00	6.76053E+01	-6.75882E+01	0.00000E+00	1.52382E+00	0.00000E+00	-1.33822E+01	9.00000E+01
5.30000E+00	6.87143E+01	-6.86974E+01	0.00000E+00	1.52429E+00	0.00000E+00	-1.31051E+01	9.00000E+01
5.33333E+00	6.98237E+01	-6.98071E+01	0.00000E+00	1.52400E+00	0.00000E+00	-1.28375E+01	9.00000E+01
5.36667E+00	7.09335E+01	-7.09172E+01	0.00000E+00	1.52306E+00	0.00000E+00	-1.25790E+01	9.00000E+01



[illegible]

[illegible]

[illegible]

1Boat 30 mph

Request Number	32031
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2.00000E+01	1.30771E+02	1.30771E+02	1.30771E+02	0.00000E+00	-1.87588E-01	0.00000E+00	-7.33209E-01	9.00000E+01
2.33333E-01	1.29307E+02	1.29307E+02	1.29307E+02	0.00000E+00	-1.47542E-01	0.00000E+00	-8.71037E-01	9.00000E+01
2.66667E-01	1.27843E+02	1.27843E+02	1.27843E+02	0.00000E+00	-1.10164E-01	0.00000E+00	-1.00100E+00	9.00000E+01
3.00000E-01	1.26378E+02	1.26378E+02	1.26378E+02	0.00000E+00	-7.58579E-02	0.00000E+00	-1.12335E+00	9.00000E+01
3.33333E-01	1.24913E+02	1.24913E+02	1.24913E+02	0.00000E+00	-4.48402E-02	0.00000E+00	-1.23864E+00	9.00000E+01
3.66667E-01	1.23449E+02	1.23449E+02	1.23449E+02	0.00000E+00	-1.70778E-02	0.00000E+00	-1.34755E+00	9.00000E+01
4.00000E-01	1.21984E+02	1.21984E+02	1.21984E+02	0.00000E+00	7.51098E-03	0.00000E+00	-1.45068E+00	9.00000E+01
4.33333E-01	1.20519E+02	1.20519E+02	1.20519E+02	0.00000E+00	2.90943E-02	0.00000E+00	-1.54857E+00	9.00000E+01
4.66667E-01	1.19054E+02	1.19054E+02	1.19054E+02	0.00000E+00	4.79040E-02	0.00000E+00	-1.64181E+00	9.00000E+01
5.00000E-01	1.17589E+02	1.17589E+02	1.17589E+02	0.00000E+00	6.42053E-02	0.00000E+00	-1.73090E+00	9.00000E+01
5.33333E-01	1.16124E+02	1.16124E+02	1.16124E+02	0.00000E+00	7.82764E-02	0.00000E+00	-1.81631E+00	9.00000E+01
5.66667E-01	1.14659E+02	1.14659E+02	1.14659E+02	0.00000E+00	9.04571E-02	0.00000E+00	-1.89852E+00	9.00000E+01
6.00000E-01	1.13194E+02	1.13194E+02	1.13194E+02	0.00000E+00	1.01057E-01	0.00000E+00	-1.97793E+00	9.00000E+01
6.33333E-01	1.11729E+02	1.11729E+02	1.11729E+02	0.00000E+00	1.10365E-01	0.00000E+00	-2.05485E+00	9.00000E+01
6.66667E-01	1.10264E+02	1.10264E+02	1.10264E+02	0.00000E+00	1.18646E-01	0.00000E+00	-2.12954E+00	9.00000E+01
7.00000E-01	1.08799E+02	1.08799E+02	1.08799E+02	0.00000E+00	1.26147E-01	0.00000E+00	-2.20222E+00	9.00000E+01
7.33333E-01	1.07334E+02	1.07334E+02	1.07334E+02	0.00000E+00	1.33073E-01	0.00000E+00	-2.27306E+00	9.00000E+01
7.66667E-01	1.05868E+02	1.05868E+02	1.05868E+02	0.00000E+00	1.39603E-01	0.00000E+00	-2.34219E+00	9.00000E+01
8.00000E-01	1.04403E+02	1.04403E+02	1.04403E+02	0.00000E+00	1.45885E-01	0.00000E+00	-2.40972E+00	9.00000E+01
8.33333E-01	1.02938E+02	1.02938E+02	1.02938E+02	0.00000E+00	1.52038E-01	0.00000E+00	-2.47572E+00	9.00000E+01
8.66667E-01	1.01473E+02	1.01473E+02	1.01473E+02	0.00000E+00	1.58154E-01	0.00000E+00	-2.54026E+00	9.00000E+01
9.00000E-01	1.00008E+02	1.00008E+02	1.00008E+02	0.00000E+00	1.64301E-01	0.00000E+00	-2.60337E+00	9.00000E+01
9.33333E-01	9.85422E+01	9.85422E+01	9.85422E+01	0.00000E+00	1.70524E-01	0.00000E+00	-2.66508E+00	9.00000E+01
9.66667E-01	9.70769E+01	9.70769E+01	9.70769E+01	0.00000E+00	1.76845E-01	0.00000E+00	-2.72539E+00	9.00000E+01
1.00000E+00	9.56116E+01	9.56116E+01	9.56116E+01	0.00000E+00	1.83275E-01	0.00000E+00	-2.78433E+00	9.00000E+01
1.03333E+00	9.41463E+01	9.41463E+01	9.41463E+01	0.00000E+00	1.89661E-01	0.00000E+00	-2.84191E+00	9.00000E+01
1.06667E+00	9.26809E+01	9.26809E+01	9.26809E+01	0.00000E+00	1.95731E-01	0.00000E+00	-2.89813E+00	9.00000E+01
1.10000E+00	9.12155E+01	9.12155E+01	9.12155E+01	0.00000E+00	2.01308E-01	0.00000E+00	-2.95303E+00	9.00000E+01
1.13333E+00	8.97501E+01	8.97501E+01	8.97501E+01	0.00000E+00	2.06413E-01	0.00000E+00	-3.00668E+00	9.00000E+01
1.16667E+00	8.82847E+01	8.82847E+01	8.82847E+01	0.00000E+00	2.11171E-01	0.00000E+00	-3.05912E+00	9.00000E+01
1.20000E+00	8.68192E+01	8.68192E+01	8.68192E+01	0.00000E+00	2.15726E-01	0.00000E+00	-3.11043E+00	9.00000E+01
1.23333E+00	8.53538E+01	8.53538E+01	8.53538E+01	0.00000E+00	2.20210E-01	0.00000E+00	-3.16066E+00	9.00000E+01
1.26667E+00	8.38883E+01	8.38883E+01	8.38883E+01	0.00000E+00	2.24736E-01	0.00000E+00	-3.20984E+00	9.00000E+01
1.30000E+00	8.24228E+01	8.24228E+01	8.24228E+01	0.00000E+00	2.29403E-01	0.00000E+00	-3.25799E+00	9.00000E+01
1.33333E+00	8.09573E+01	8.09573E+01	8.09573E+01	0.00000E+00	2.34291E-01	0.00000E+00	-3.30512E+00	9.00000E+01
1.36667E+00	7.94918E+01	7.94918E+01	7.94918E+01	0.00000E+00	2.39470E-01	0.00000E+00	-3.35123E+00	9.00000E+01
1.40000E+00	7.80262E+01	7.80262E+01	7.80262E+01	0.00000E+00	2.44988E-01	0.00000E+00	-3.39629E+00	9.00000E+01
1.43333E+00	7.65607E+01	7.65607E+01	7.65607E+01	0.00000E+00	2.50871E-01	0.00000E+00	-3.44030E+00	9.00000E+01
1.46667E+00	7.50951E+01	7.50951E+01	7.50951E+01	0.00000E+00	2.57128E-01	0.00000E+00	-3.48321E+00	9.00000E+01
1.50000E+00	7.36295E+01	7.36295E+01	7.36295E+01	0.00000E+00	2.63747E-01	0.00000E+00	-3.52500E+00	9.00000E+01
1.53333E+00	7.21639E+01	7.21639E+01	7.21639E+01	0.00000E+00	2.70697E-01	0.00000E+00	-3.56565E+00	9.00000E+01
1.56667E+00	7.06982E+01	7.06982E+01	7.06982E+01	0.00000E+00	2.77928E-01	0.00000E+00	-3.60512E+00	9.00000E+01
1.60000E+00	6.92325E+01	6.92325E+01	6.92325E+01	0.00000E+00	2.85375E-01	0.00000E+00	-3.64340E+00	9.00000E+01
1.63333E+00	6.77669E+01	6.77669E+01	6.77669E+01	0.00000E+00	2.92960E-01	0.00000E+00	-3.68047E+00	9.00000E+01
1.66667E+00	6.63011E+01	6.63011E+01	6.63011E+01	0.00000E+00	3.00596E-01	0.00000E+00	-3.71633E+00	9.00000E+01
1.70000E+00	6.48354E+01	6.48354E+01	6.48354E+01	0.00000E+00	3.08189E-01	0.00000E+00	-3.75098E+00	9.00000E+01
1.73333E+00	6.33689E+01	6.33689E+01	6.33689E+01	0.00000E+00	3.15641E-01	0.00000E+00	-3.78444E+00	9.00000E+01
1.76667E+00	6.19039E+01	6.19039E+01	6.19039E+01	0.00000E+00	3.22858E-01	0.00000E+00	-3.81673E+00	9.00000E+01
1.80000E+00	6.04381E+01	6.04381E+01	6.04381E+01	0.00000E+00	3.29749E-01	0.00000E+00	-3.84788E+00	9.00000E+01
1.83333E+00	5.89713E+01	5.89713E+01	5.89713E+01	0.00000E+00	3.36233E-01	0.00000E+00	-3.87795E+00	9.00000E+01
1.86667E+00	5.75054E+01	5.75054E+01	5.75054E+01	0.00000E+00	3.42237E-01	0.00000E+00	-3.90697E+00	9.00000E+01
1.90000E+00	5.60405E+01	5.60405E+01	5.60405E+01	0.00000E+00	3.47706E-01	0.00000E+00	-3.93503E+00	9.00000E+01
1.93333E+00	5.45734E+01	5.45734E+01	5.45734E+01	0.00000E+00	3.52597E-01	0.00000E+00	-3.96217E+00	9.00000E+01
1.96667E+00	5.31087E+01	5.31087E+01	5.31087E+01	0.00000E+00	3.56888E-01	0.00000E+00	-3.98847E+00	9.00000E+01

2.00000E+00	5.16427E+01	5.16415E+01	0.00000E+00	3.60569E-01	0.00000E+00	-4.01399E+00	9.00000E+01
2.03333E+00	5.01768E+01	5.01755E+01	0.00000E+00	3.63647E-01	0.00000E+00	-4.03876E+00	9.00000E+01
2.06667E+00	4.87108E+01	4.87094E+01	0.00000E+00	3.66147E-01	0.00000E+00	-4.06286E+00	9.00000E+01
2.10000E+00	4.72434E+01	4.72434E+01	0.00000E+00	3.68118E-01	0.00000E+00	-4.08635E+00	9.00000E+01
2.13333E+00	4.57788E+01	4.57773E+01	0.00000E+00	3.69623E-01	0.00000E+00	-4.10931E+00	9.00000E+01
2.16667E+00	4.43128E+01	4.43113E+01	0.00000E+00	3.70741E-01	0.00000E+00	-4.13180E+00	9.00000E+01
2.20000E+00	4.28468E+01	4.28452E+01	0.00000E+00	3.71559E-01	0.00000E+00	-4.15388E+00	9.00000E+01
2.23333E+00	4.13808E+01	4.13791E+01	0.00000E+00	3.72175E-01	0.00000E+00	-4.17560E+00	9.00000E+01
2.26667E+00	3.99147E+01	3.99130E+01	0.00000E+00	3.72887E-01	0.00000E+00	-4.19700E+00	9.00000E+01
2.30000E+00	3.84487E+01	3.84469E+01	0.00000E+00	3.73196E-01	0.00000E+00	-4.21811E+00	9.00000E+01
2.33333E+00	3.69827E+01	3.69808E+01	0.00000E+00	3.73796E-01	0.00000E+00	-4.23894E+00	9.00000E+01
2.36667E+00	3.55167E+01	3.55147E+01	0.00000E+00	3.74577E-01	0.00000E+00	-4.25949E+00	9.00000E+01
2.40000E+00	3.40506E+01	3.40486E+01	0.00000E+00	3.75208E-01	0.00000E+00	-4.27976E+00	9.00000E+01
2.43333E+00	3.25845E+01	3.25824E+01	0.00000E+00	3.75989E-01	0.00000E+00	-4.29972E+00	9.00000E+01
2.46667E+00	3.11188E+01	3.11163E+01	0.00000E+00	3.78733E-01	0.00000E+00	-4.31935E+00	9.00000E+01
2.50000E+00	2.96526E+01	2.96502E+01	0.00000E+00	3.80884E-01	0.00000E+00	-4.33862E+00	9.00000E+01
2.53333E+00	2.81866E+01	2.81840E+01	0.00000E+00	3.83456E-01	0.00000E+00	-4.35748E+00	9.00000E+01
2.56667E+00	2.67206E+01	2.67178E+01	0.00000E+00	3.86444E-01	0.00000E+00	-4.37589E+00	9.00000E+01
2.60000E+00	2.52547E+01	2.52517E+01	0.00000E+00	3.89815E-01	0.00000E+00	-4.39380E+00	9.00000E+01
2.63333E+00	2.37887E+01	2.37855E+01	0.00000E+00	3.93544E-01	0.00000E+00	-4.41118E+00	9.00000E+01
2.66667E+00	2.23228E+01	2.23193E+01	0.00000E+00	3.97571E-01	0.00000E+00	-4.42798E+00	9.00000E+01
2.70000E+00	2.08569E+01	2.08531E+01	0.00000E+00	4.01826E-01	0.00000E+00	-4.44419E+00	9.00000E+01
2.73333E+00	1.93911E+01	1.93868E+01	0.00000E+00	4.06231E-01	0.00000E+00	-4.45975E+00	9.00000E+01
2.76667E+00	1.79253E+01	1.79206E+01	0.00000E+00	4.10897E-01	0.00000E+00	-4.47468E+00	9.00000E+01
2.80000E+00	1.64595E+01	1.64543E+01	0.00000E+00	4.15136E-01	0.00000E+00	-4.48894E+00	9.00000E+01
2.83333E+00	1.49939E+01	1.49880E+01	0.00000E+00	4.19458E-01	0.00000E+00	-4.50255E+00	9.00000E+01
2.86667E+00	1.35283E+01	1.35217E+01	0.00000E+00	4.23574E-01	0.00000E+00	-4.51553E+00	9.00000E+01
2.90000E+00	1.20529E+01	1.20554E+01	0.00000E+00	4.27403E-01	0.00000E+00	-4.52788E+00	9.00000E+01
2.93333E+00	1.05978E+01	1.05890E+01	0.00000E+00	4.30871E-01	0.00000E+00	-4.53965E+00	9.00000E+01
2.96667E+00	9.13298E+00	9.12267E+00	0.00000E+00	4.33917E-01	0.00000E+00	-4.55087E+00	9.00000E+01
3.00000E+00	7.66874E+00	7.65631E+00	0.00000E+00	4.36497E-01	0.00000E+00	-4.56159E+00	9.00000E+01
3.03333E+00	6.20544E+00	6.18993E+00	0.00000E+00	4.38582E-01	0.00000E+00	-4.57187E+00	9.00000E+01
3.06667E+00	4.74400E+00	4.72353E+00	0.00000E+00	4.40157E-01	0.00000E+00	-4.58176E+00	9.00000E+01
3.10000E+00	3.28589E+00	3.25714E+00	0.00000E+00	4.41229E-01	0.00000E+00	-4.59133E+00	9.00000E+01
3.13333E+00	1.84656E+00	1.79238E+00	0.00000E+00	4.44031E-01	0.00000E+00	-4.60579E+00	9.00000E+01
3.16667E+00	6.12621E-01	3.64165E-01	0.00000E+00	4.92634E-01	0.00000E+00	-4.71147E+00	9.00000E+01
3.20000E+00	1.18270E+00	-1.06059E+00	0.00000E+00	5.23379E-01	0.00000E+00	-4.74291E+00	9.00000E+01
3.23333E+00	2.54707E+00	-2.49210E+00	0.00000E+00	5.26338E-01	0.00000E+00	-4.70954E+00	9.00000E+01
3.26667E+00	3.95300E+00	-3.91784E+00	0.00000E+00	5.26047E-01	0.00000E+00	-4.68547E+00	9.00000E+01
3.30000E+00	5.35943E+00	-5.33344E+00	0.00000E+00	5.27187E-01	0.00000E+00	-4.70092E+00	9.00000E+01
3.33333E+00	6.64983E+00	-6.62048E+00	0.00000E+00	6.24033E-01	0.00000E+00	-6.03910E+00	9.00000E+01
3.36667E+00	7.64992E+00	-7.58198E+00	0.00000E+00	1.01726E+00	0.00000E+00	-1.12162E+01	9.00000E+01
3.40000E+00	8.47015E+00	-8.31636E+00	0.00000E+00	1.60671E+00	0.00000E+00	-1.89897E+01	9.00000E+01
3.43333E+00	9.27528E+00	-9.03715E+00	0.00000E+00	2.08825E+00	0.00000E+00	-2.56629E+01	9.00000E+01
3.46667E+00	1.01103E+01	-9.81682E+00	0.00000E+00	2.41847E+00	0.00000E+00	-3.04751E+01	9.00000E+01
3.50000E+00	1.09732E+01	-1.06489E+01	0.00000E+00	2.64832E+00	0.00000E+00	-3.39278E+01	9.00000E+01
3.53333E+00	1.18618E+01	-1.15243E+01	0.00000E+00	2.80965E+00	0.00000E+00	-3.63619E+01	9.00000E+01
3.56667E+00	1.27796E+01	-1.24395E+01	0.00000E+00	2.92832E+00	0.00000E+00	-3.78797E+01	9.00000E+01
3.60000E+00	1.37305E+01	-1.33925E+01	0.00000E+00	3.02785E+00	0.00000E+00	-3.85228E+01	9.00000E+01
3.63333E+00	1.47164E+01	-1.43814E+01	0.00000E+00	3.12231E+00	0.00000E+00	-3.83880E+01	9.00000E+01
3.66667E+00	1.57209E+01	-1.53922E+01	0.00000E+00	3.19777E+00	0.00000E+00	-3.78771E+01	9.00000E+01
3.70000E+00	1.67252E+01	-1.64089E+01	0.00000E+00	3.23723E+00	0.00000E+00	-3.72916E+01	9.00000E+01
3.73333E+00	1.77268E+01	-1.74287E+01	0.00000E+00	3.23730E+00	0.00000E+00	-3.66581E+01	9.00000E+01
3.76667E+00	1.87270E+01	-1.84515E+01	0.00000E+00	3.20038E+00	0.00000E+00	-3.59659E+01	9.00000E+01



3.80000E+00	1.97262E+01	-1.94764E+01	0.00000E+00	3.12956E+00	0.00000E+00	-3.52284E+01	9.00000E+01
3.83333E+00	2.07235E+01	-2.05012E+01	0.00000E+00	3.02722E+00	0.00000E+00	-3.44785E+01	9.00000E+01
3.86667E+00	2.17153E+01	-2.15215E+01	0.00000E+00	2.89472E+00	0.00000E+00	-3.38717E+01	9.00000E+01
3.90000E+00	2.27117E+01	-2.25457E+01	0.00000E+00	2.74122E+00	0.00000E+00	-3.34803E+01	9.00000E+01
3.93333E+00	2.37183E+01	-2.35783E+01	0.00000E+00	2.57319E+00	0.00000E+00	-3.31383E+01	9.00000E+01
3.96667E+00	2.47333E+01	-2.46179E+01	0.00000E+00	2.38636E+00	0.00000E+00	-3.27476E+01	9.00000E+01
4.00000E+00	2.57558E+01	-2.56637E+01	0.00000E+00	2.17583E+00	0.00000E+00	-3.23045E+01	9.00000E+01
4.03333E+00	2.67873E+01	-2.67156E+01	0.00000E+00	1.95865E+00	0.00000E+00	-3.18137E+01	9.00000E+01
4.06667E+00	2.78283E+01	-2.77730E+01	0.00000E+00	1.75378E+00	0.00000E+00	-3.12828E+01	9.00000E+01
4.10000E+00	2.88778E+01	-2.88353E+01	0.00000E+00	1.56464E+00	0.00000E+00	-3.07180E+01	9.00000E+01
4.13333E+00	2.99346E+01	-2.99023E+01	0.00000E+00	1.39097E+00	0.00000E+00	-3.01251E+01	9.00000E+01
4.16667E+00	3.09977E+01	-3.09732E+01	0.00000E+00	1.23224E+00	0.00000E+00	-2.95104E+01	9.00000E+01
4.20000E+00	3.20663E+01	-3.20478E+01	0.00000E+00	1.08823E+00	0.00000E+00	-2.88785E+01	9.00000E+01
4.23333E+00	3.31395E+01	-3.31257E+01	0.00000E+00	9.58881E-01	0.00000E+00	-2.82344E+01	9.00000E+01
4.26667E+00	3.42168E+01	-3.42084E+01	0.00000E+00	8.44160E-01	0.00000E+00	-2.75827E+01	9.00000E+01
4.30000E+00	3.52975E+01	-3.52897E+01	0.00000E+00	7.44036E-01	0.00000E+00	-2.69281E+01	9.00000E+01
4.33333E+00	3.63811E+01	-3.63751E+01	0.00000E+00	6.58384E-01	0.00000E+00	-2.62745E+01	9.00000E+01
4.36667E+00	3.74671E+01	-3.74625E+01	0.00000E+00	5.86916E-01	0.00000E+00	-2.56258E+01	9.00000E+01
4.40000E+00	3.85533E+01	-3.85517E+01	0.00000E+00	5.29293E-01	0.00000E+00	-2.49842E+01	9.00000E+01
4.43333E+00	3.96453E+01	-3.96423E+01	0.00000E+00	4.84812E-01	0.00000E+00	-2.43532E+01	9.00000E+01
4.46667E+00	4.07367E+01	-4.07342E+01	0.00000E+00	4.52515E-01	0.00000E+00	-2.37353E+01	9.00000E+01
4.50000E+00	4.18294E+01	-4.18272E+01	0.00000E+00	4.31245E-01	0.00000E+00	-2.31320E+01	9.00000E+01
4.53333E+00	4.29233E+01	-4.29212E+01	0.00000E+00	4.19712E-01	0.00000E+00	-2.25444E+01	9.00000E+01
4.56667E+00	4.40182E+01	-4.40162E+01	0.00000E+00	4.16560E-01	0.00000E+00	-2.19731E+01	9.00000E+01
4.60000E+00	4.51140E+01	-4.51120E+01	0.00000E+00	4.20420E-01	0.00000E+00	-2.14184E+01	9.00000E+01
4.63333E+00	4.62106E+01	-4.62086E+01	0.00000E+00	4.29952E-01	0.00000E+00	-2.08805E+01	9.00000E+01
4.66667E+00	4.73081E+01	-4.73060E+01	0.00000E+00	4.43876E-01	0.00000E+00	-2.03591E+01	9.00000E+01
4.70000E+00	4.84064E+01	-4.84042E+01	0.00000E+00	4.61007E-01	0.00000E+00	-1.98540E+01	9.00000E+01
4.73333E+00	4.95053E+01	-4.95030E+01	0.00000E+00	4.80284E-01	0.00000E+00	-1.93648E+01	9.00000E+01
4.76667E+00	5.06050E+01	-5.06025E+01	0.00000E+00	5.00778E-01	0.00000E+00	-1.88911E+01	9.00000E+01
4.80000E+00	5.17035E+01	-5.17027E+01	0.00000E+00	5.21700E-01	0.00000E+00	-1.84325E+01	9.00000E+01
4.83333E+00	5.28063E+01	-5.28035E+01	0.00000E+00	5.42367E-01	0.00000E+00	-1.79885E+01	9.00000E+01
4.86667E+00	5.39079E+01	-5.39050E+01	0.00000E+00	5.62293E-01	0.00000E+00	-1.75589E+01	9.00000E+01
4.90000E+00	5.50101E+01	-5.50070E+01	0.00000E+00	5.81078E-01	0.00000E+00	-1.71432E+01	9.00000E+01
4.93333E+00	5.61129E+01	-5.61097E+01	0.00000E+00	5.98430E-01	0.00000E+00	-1.67410E+01	9.00000E+01
4.96667E+00	5.72162E+01	-5.72129E+01	0.00000E+00	6.14153E-01	0.00000E+00	-1.63519E+01	9.00000E+01
5.00000E+00	5.83200E+01	-5.83166E+01	0.00000E+00	6.28135E-01	0.00000E+00	-1.59756E+01	9.00000E+01
5.03333E+00	5.94244E+01	-5.94209E+01	0.00000E+00	6.40333E-01	0.00000E+00	-1.56116E+01	9.00000E+01
5.06667E+00	6.05292E+01	-6.05257E+01	0.00000E+00	6.50763E-01	0.00000E+00	-1.52598E+01	9.00000E+01
5.10000E+00	6.16346E+01	-6.16311E+01	0.00000E+00	6.59485E-01	0.00000E+00	-1.49196E+01	9.00000E+01
5.13333E+00	6.27405E+01	-6.27369E+01	0.00000E+00	6.66592E-01	0.00000E+00	-1.45907E+01	9.00000E+01
5.16667E+00	6.38468E+01	-6.38432E+01	0.00000E+00	6.72202E-01	0.00000E+00	-1.42729E+01	9.00000E+01
5.20000E+00	6.49535E+01	-6.49500E+01	0.00000E+00	6.76451E-01	0.00000E+00	-1.39657E+01	9.00000E+01
5.23333E+00	6.60608E+01	-6.60573E+01	0.00000E+00	6.79483E-01	0.00000E+00	-1.36689E+01	9.00000E+01
5.26667E+00	6.71684E+01	-6.71650E+01	0.00000E+00	6.81445E-01	0.00000E+00	-1.33822E+01	9.00000E+01
5.30000E+00	6.82765E+01	-6.82731E+01	0.00000E+00	6.82484E-01	0.00000E+00	-1.31051E+01	9.00000E+01
5.33333E+00	6.93851E+01	-6.93817E+01	0.00000E+00	6.82741E-01	0.00000E+00	-1.28375E+01	9.00000E+01
5.36667E+00	7.04940E+01	-7.04907E+01	0.00000E+00	6.82346E-01	0.00000E+00	-1.25790E+01	9.00000E+01
5.40000E+00	7.16034E+01	-7.16002E+01	0.00000E+00	6.81425E-01	0.00000E+00	-1.23294E+01	9.00000E+01
5.43333E+00	7.27132E+01	-7.27100E+01	0.00000E+00	6.80087E-01	0.00000E+00	-1.20883E+01	9.00000E+01
5.46667E+00	7.38233E+01	-7.38202E+01	0.00000E+00	6.78429E-01	0.00000E+00	-1.18555E+01	9.00000E+01
5.50000E+00	7.49339E+01	-7.49308E+01	0.00000E+00	6.76538E-01	0.00000E+00	-1.16308E+01	9.00000E+01
5.53333E+00	7.60448E+01	-7.60419E+01	0.00000E+00	6.74486E-01	0.00000E+00	-1.14138E+01	9.00000E+01
5.56667E+00	7.71562E+01	-7.71532E+01	0.00000E+00	6.72335E-01	0.00000E+00	-1.12043E+01	9.00000E+01



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**boat30.out**

Thu Oct 31 12:22:24 1991

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3.66667E-01	1.23941E+02	1.23940E+02	0.00000E+00	-4.29749E-01	0.00000E+00	-1.34755E+00	9.00000E+01
4.00000E-01	1.22475E+02	1.22475E+02	0.00000E+00	-4.06044E-01	0.00000E+00	-1.45068E+00	9.00000E+01
4.33333E-01	1.21010E+02	1.21009E+02	0.00000E+00	-3.85299E-01	0.00000E+00	-1.54857E+00	9.00000E+01
4.66667E-01	1.19544E+02	1.19544E+02	0.00000E+00	-3.67286E-01	0.00000E+00	-1.64181E+00	9.00000E+01
5.00000E-01	1.18078E+02	1.18078E+02	0.00000E+00	-3.51745E-01	0.00000E+00	-1.73090E+00	9.00000E+01
5.33333E-01	1.16613E+02	1.16612E+02	0.00000E+00	-3.38401E-01	0.00000E+00	-1.81631E+00	9.00000E+01
5.66667E-01	1.15147E+02	1.15147E+02	0.00000E+00	-3.26921E-01	0.00000E+00	-1.89852E+00	9.00000E+01
6.00000E-01	1.13681E+02	1.13681E+02	0.00000E+00	-3.16986E-01	0.00000E+00	-1.97793E+00	9.00000E+01
6.33333E-01	1.12216E+02	1.12215E+02	0.00000E+00	-3.08341E-01	0.00000E+00	-2.05485E+00	9.00000E+01
6.66667E-01	1.10750E+02	1.10750E+02	0.00000E+00	-3.00694E-01	0.00000E+00	-2.12954E+00	9.00000E+01
7.00000E-01	1.09284E+02	1.09284E+02	0.00000E+00	-2.93808E-01	0.00000E+00	-2.20222E+00	9.00000E+01
7.33333E-01	1.07819E+02	1.07819E+02	0.00000E+00	-2.87492E-01	0.00000E+00	-2.27306E+00	9.00000E+01
7.66667E-01	1.06353E+02	1.06353E+02	0.00000E+00	-2.81537E-01	0.00000E+00	-2.34219E+00	9.00000E+01
8.00000E-01	1.04887E+02	1.04887E+02	0.00000E+00	-2.75825E-01	0.00000E+00	-2.40972E+00	9.00000E+01
8.33333E-01	1.03421E+02	1.03421E+02	0.00000E+00	-2.70229E-01	0.00000E+00	-2.47572E+00	9.00000E+01
8.66667E-01	1.01955E+02	1.01955E+02	0.00000E+00	-2.64657E-01	0.00000E+00	-2.54026E+00	9.00000E+01
9.00000E-01	1.00490E+02	1.00490E+02	0.00000E+00	-2.59041E-01	0.00000E+00	-2.60337E+00	9.00000E+01
9.33333E-01	9.90242E+01	9.90239E+01	0.00000E+00	-2.53338E-01	0.00000E+00	-2.66508E+00	9.00000E+01
9.66667E-01	9.75585E+01	9.75581E+01	0.00000E+00	-2.47524E-01	0.00000E+00	-2.72539E+00	9.00000E+01
1.00000E+00	9.60927E+01	9.60924E+01	0.00000E+00	-2.41588E-01	0.00000E+00	-2.78433E+00	9.00000E+01
1.03333E+00	9.46269E+01	9.46266E+01	0.00000E+00	-2.35686E-01	0.00000E+00	-2.84191E+00	9.00000E+01
1.06667E+00	9.31611E+01	9.31608E+01	0.00000E+00	-2.30086E-01	0.00000E+00	-2.89813E+00	9.00000E+01
1.10000E+00	9.16952E+01	9.16950E+01	0.00000E+00	-2.24969E-01	0.00000E+00	-2.95303E+00	9.00000E+01
1.13333E+00	9.02294E+01	9.02292E+01	0.00000E+00	-2.20314E-01	0.00000E+00	-3.00668E+00	9.00000E+01
1.16667E+00	8.87636E+01	8.87633E+01	0.00000E+00	-2.15994E-01	0.00000E+00	-3.05912E+00	9.00000E+01
1.20000E+00	8.72977E+01	8.72975E+01	0.00000E+00	-2.11868E-01	0.00000E+00	-3.11043E+00	9.00000E+01
1.23333E+00	8.58319E+01	8.58316E+01	0.00000E+00	-2.07804E-01	0.00000E+00	-3.16066E+00	9.00000E+01
1.26667E+00	8.43660E+01	8.43658E+01	0.00000E+00	-2.03687E-01	0.00000E+00	-3.20984E+00	9.00000E+01
1.30000E+00	8.29001E+01	8.28999E+01	0.00000E+00	-1.99422E-01	0.00000E+00	-3.25799E+00	9.00000E+01
1.33333E+00	8.14342E+01	8.14340E+01	0.00000E+00	-1.94926E-01	0.00000E+00	-3.30512E+00	9.00000E+01
1.36667E+00	7.99683E+01	7.99681E+01	0.00000E+00	-1.90131E-01	0.00000E+00	-3.35123E+00	9.00000E+01
1.40000E+00	7.85024E+01	7.85022E+01	0.00000E+00	-1.84988E-01	0.00000E+00	-3.39629E+00	9.00000E+01
1.43333E+00	7.70365E+01	7.70363E+01	0.00000E+00	-1.79470E-01	0.00000E+00	-3.44030E+00	9.00000E+01
1.46667E+00	7.55705E+01	7.55703E+01	0.00000E+00	-1.73705E-01	0.00000E+00	-3.48321E+00	9.00000E+01
1.50000E+00	7.41046E+01	7.41044E+01	0.00000E+00	-1.67298E-01	0.00000E+00	-3.52500E+00	9.00000E+01
1.53333E+00	7.26386E+01	7.26384E+01	0.00000E+00	-1.60695E-01	0.00000E+00	-3.56565E+00	9.00000E+01
1.56667E+00	7.11725E+01	7.11725E+01	0.00000E+00	-1.53781E-01	0.00000E+00	-3.60512E+00	9.00000E+01
1.60000E+00	6.97065E+01	6.97065E+01	0.00000E+00	-1.46651E-01	0.00000E+00	-3.64340E+00	9.00000E+01
1.63333E+00	6.82406E+01	6.82405E+01	0.00000E+00	-1.39373E-01	0.00000E+00	-3.68047E+00	9.00000E+01
1.66667E+00	6.67746E+01	6.67744E+01	0.00000E+00	-1.32034E-01	0.00000E+00	-3.71633E+00	9.00000E+01
1.70000E+00	6.53085E+01	6.53084E+01	0.00000E+00	-1.24728E-01	0.00000E+00	-3.75098E+00	9.00000E+01
1.73333E+00	6.38424E+01	6.38423E+01	0.00000E+00	-1.17552E-01	0.00000E+00	-3.78444E+00	9.00000E+01
1.76667E+00	6.23763E+01	6.23762E+01	0.00000E+00	-1.10602E-01	0.00000E+00	-3.81673E+00	9.00000E+01
1.80000E+00	6.09102E+01	6.09101E+01	0.00000E+00	-1.03968E-01	0.00000E+00	-3.84788E+00	9.00000E+01
1.83333E+00	5.94440E+01	5.94440E+01	0.00000E+00	-9.77325E-02	0.00000E+00	-3.87795E+00	9.00000E+01
1.86667E+00	5.79779E+01	5.79779E+01	0.00000E+00	-9.19675E-02	0.00000E+00	-3.90697E+00	9.00000E+01
1.90000E+00	5.65117E+01	5.65117E+01	0.00000E+00	-8.67303E-02	0.00000E+00	-3.93503E+00	9.00000E+01
1.93333E+00	5.50456E+01	5.50456E+01	0.00000E+00	-8.20623E-02	0.00000E+00	-3.96217E+00	9.00000E+01
1.96667E+00	5.35794E+01	5.35794E+01	0.00000E+00	-7.79883E-02	0.00000E+00	-3.98847E+00	9.00000E+01
2.00000E+00	5.21132E+01	5.21132E+01	0.00000E+00	-7.45174E-02	0.00000E+00	-4.01399E+00	9.00000E+01
2.03333E+00	5.06470E+01	5.06470E+01	0.00000E+00	-7.16434E-02	0.00000E+00	-4.03876E+00	9.00000E+01
2.06667E+00	4.91808E+01	4.91808E+01	0.00000E+00	-6.93411E-02	0.00000E+00	-4.06286E+00	9.00000E+01
2.10000E+00	4.77146E+01	4.77145E+01	0.00000E+00	-6.75638E-02	0.00000E+00	-4.08635E+00	9.00000E+01
2.13333E+00	4.62484E+01	4.62483E+01	0.00000E+00	-6.62474E-02	0.00000E+00	-4.10931E+00	9.00000E+01
2.16667E+00	4.47821E+01	4.47821E+01	0.00000E+00	-6.53147E-02	0.00000E+00	-4.13180E+00	9.00000E+01

2.20000E+00	4.33159E+01	4.33158E+01	0.00000E+00	-6.46776E-02	0.00000E+00	-4.15388E+00	9.00000E+01
2.23333E+00	4.18496E+01	4.18496E+01	0.00000E+00	-6.42404E-02	0.00000E+00	-4.17560E+00	9.00000E+01
2.26667E+00	4.03834E+01	4.03833E+01	0.00000E+00	-6.39036E-02	0.00000E+00	-4.19700E+00	9.00000E+01
2.30000E+00	3.89171E+01	3.89171E+01	0.00000E+00	-6.35682E-02	0.00000E+00	-4.21811E+00	9.00000E+01
2.33333E+00	3.74508E+01	3.74508E+01	0.00000E+00	-6.31386E-02	0.00000E+00	-4.23894E+00	9.00000E+01
2.36667E+00	3.59846E+01	3.59845E+01	0.00000E+00	-6.25263E-02	0.00000E+00	-4.25949E+00	9.00000E+01
2.40000E+00	3.45183E+01	3.45182E+01	0.00000E+00	-6.16495E-02	0.00000E+00	-4.27976E+00	9.00000E+01
2.43333E+00	3.30520E+01	3.30520E+01	0.00000E+00	-6.04443E-02	0.00000E+00	-4.29972E+00	9.00000E+01
2.46667E+00	3.15857E+01	3.15857E+01	0.00000E+00	-5.88615E-02	0.00000E+00	-4.31935E+00	9.00000E+01
2.50000E+00	3.01194E+01	3.01194E+01	0.00000E+00	-5.68683E-02	0.00000E+00	-4.33862E+00	9.00000E+01
2.53333E+00	2.86531E+01	2.86531E+01	0.00000E+00	-5.44506E-02	0.00000E+00	-4.35748E+00	9.00000E+01
2.56667E+00	2.71868E+01	2.71868E+01	0.00000E+00	-5.16135E-02	0.00000E+00	-4.37589E+00	9.00000E+01
2.60000E+00	2.57205E+01	2.57205E+01	0.00000E+00	-4.83890E-02	0.00000E+00	-4.39380E+00	9.00000E+01
2.63333E+00	2.42542E+01	2.42542E+01	0.00000E+00	-4.48020E-02	0.00000E+00	-4.41118E+00	9.00000E+01
2.66667E+00	2.27879E+01	2.27878E+01	0.00000E+00	-4.09126E-02	0.00000E+00	-4.42798E+00	9.00000E+01
2.70000E+00	2.13215E+01	2.13215E+01	0.00000E+00	-3.67894E-02	0.00000E+00	-4.44419E+00	9.00000E+01
2.73333E+00	1.98551E+01	1.98551E+01	0.00000E+00	-3.25124E-02	0.00000E+00	-4.45975E+00	9.00000E+01
2.76667E+00	1.83888E+01	1.83887E+01	0.00000E+00	-2.81680E-02	0.00000E+00	-4.47468E+00	9.00000E+01
2.80000E+00	1.69224E+01	1.69224E+01	0.00000E+00	-2.38454E-02	0.00000E+00	-4.48894E+00	9.00000E+01
2.83333E+00	1.54560E+01	1.54560E+01	0.00000E+00	-1.96351E-02	0.00000E+00	-4.50255E+00	9.00000E+01
2.86667E+00	1.39896E+01	1.39896E+01	0.00000E+00	-1.56248E-02	0.00000E+00	-4.51553E+00	9.00000E+01
2.90000E+00	1.25232E+01	1.25232E+01	0.00000E+00	-1.18964E-02	0.00000E+00	-4.52788E+00	9.00000E+01
2.93333E+00	1.10567E+01	1.10567E+01	0.00000E+00	-8.52516E-03	0.00000E+00	-4.53965E+00	9.00000E+01
2.96667E+00	9.59028E+00	9.59028E+00	0.00000E+00	-5.57025E-03	0.00000E+00	-4.55087E+00	9.00000E+01
3.00000E+00	8.12383E+00	8.12383E+00	0.00000E+00	-3.07742E-03	0.00000E+00	-4.56159E+00	9.00000E+01
3.03333E+00	6.65737E+00	6.65737E+00	0.00000E+00	-1.07700E-03	0.00000E+00	-4.57187E+00	9.00000E+01
3.06667E+00	5.19090E+00	5.19090E+00	0.00000E+00	4.17620E-04	0.00000E+00	-4.58176E+00	9.00000E+01
3.10000E+00	3.72443E+00	3.72443E+00	0.00000E+00	1.41113E-03	0.00000E+00	-4.59133E+00	9.00000E+01
3.13333E+00	2.25954E+00	2.25954E+00	0.00000E+00	4.07359E-03	0.00000E+00	-4.60579E+00	9.00000E+01
3.16667E+00	8.31607E-01	8.30024E-01	0.00000E+00	5.12977E-02	0.00000E+00	-4.71147E+00	9.00000E+01
3.20000E+00	6.00909E-01	-5.95375E-01	0.00000E+00	8.13676E-02	0.00000E+00	-4.74291E+00	9.00000E+01
3.23333E+00	2.02852E+00	-2.02676E+00	0.00000E+00	8.44467E-02	0.00000E+00	-4.70954E+00	9.00000E+01
3.26667E+00	3.45344E+00	-3.45241E+00	0.00000E+00	8.42601E-02	0.00000E+00	-4.68547E+00	9.00000E+01
3.30000E+00	4.86881E+00	-4.86806E+00	0.00000E+00	8.53415E-02	0.00000E+00	-4.70092E+00	9.00000E+01
3.33333E+00	6.11617E+00	-6.11592E+00	0.00000E+00	1.77905E-01	0.00000E+00	-6.03910E+00	9.00000E+01
3.36667E+00	7.15745E+00	-7.13582E+00	0.00000E+00	5.56024E-01	0.00000E+00	-1.12162E+01	9.00000E+01
3.40000E+00	7.97076E+00	-7.89077E+00	0.00000E+00	1.12643E+00	0.00000E+00	-1.89897E+01	9.00000E+01
3.43333E+00	8.77199E+00	-8.62561E+00	0.00000E+00	1.59587E+00	0.00000E+00	-2.56629E+01	9.00000E+01
3.46667E+00	9.60622E+00	-9.41233E+00	0.00000E+00	1.92028E+00	0.00000E+00	-3.04751E+01	9.00000E+01
3.50000E+00	1.04702E+01	-1.02476E+01	0.00000E+00	2.14752E+00	0.00000E+00	-3.39278E+01	9.00000E+01
3.53333E+00	1.13612E+01	-1.11243E+01	0.00000E+00	2.30779E+00	0.00000E+00	-3.63619E+01	9.00000E+01
3.56667E+00	1.22818E+01	-1.20397E+01	0.00000E+00	2.42639E+00	0.00000E+00	-3.78797E+01	9.00000E+01
3.60000E+00	1.32352E+01	-1.29918E+01	0.00000E+00	2.52662E+00	0.00000E+00	-3.85228E+01	9.00000E+01
3.63333E+00	1.42230E+01	-1.39791E+01	0.00000E+00	2.62233E+00	0.00000E+00	-3.83880E+01	9.00000E+01
3.66667E+00	1.52296E+01	-1.49886E+01	0.00000E+00	2.69889E+00	0.00000E+00	-3.78771E+01	9.00000E+01
3.70000E+00	1.62372E+01	-1.60046E+01	0.00000E+00	2.73894E+00	0.00000E+00	-3.72916E+01	9.00000E+01
3.73333E+00	1.72430E+01	-1.70240E+01	0.00000E+00	2.73926E+00	0.00000E+00	-3.66581E+01	9.00000E+01
3.76667E+00	1.82479E+01	-1.80466E+01	0.00000E+00	2.70248E+00	0.00000E+00	-3.59659E+01	9.00000E+01
3.80000E+00	1.92522E+01	-1.90714E+01	0.00000E+00	2.63173E+00	0.00000E+00	-3.52284E+01	9.00000E+01
3.83333E+00	2.02548E+01	-2.00962E+01	0.00000E+00	2.52949E+00	0.00000E+00	-3.44785E+01	9.00000E+01
3.86667E+00	2.12513E+01	-2.11156E+01	0.00000E+00	2.39767E+00	0.00000E+00	-3.38717E+01	9.00000E+01
3.90000E+00	2.22520E+01	-2.21385E+01	0.00000E+00	2.24527E+00	0.00000E+00	-3.34803E+01	9.00000E+01
3.93333E+00	2.32632E+01	-2.31702E+01	0.00000E+00	2.07799E+00	0.00000E+00	-3.31383E+01	9.00000E+01
3.96667E+00	2.42831E+01	-2.42093E+01	0.00000E+00	1.89153E+00	0.00000E+00	-3.27476E+01	9.00000E+01

4.00000E+00	2.53108E+01	-2.52549E+01	0.00000E+00	1.68122E+00	0.00000E+00	-3.23045E+01	9.00000E+01
4.03333E+00	2.63473E+01	-2.63065E+01	0.00000E+00	1.46420E+00	0.00000E+00	-3.18137E+01	9.00000E+01
4.06667E+00	2.73927E+01	-2.73637E+01	0.00000E+00	1.25951E+00	0.00000E+00	-3.12828E+01	9.00000E+01
4.10000E+00	2.84459E+01	-2.84258E+01	0.00000E+00	1.07063E+00	0.00000E+00	-3.07180E+01	9.00000E+01
4.13333E+00	2.95059E+01	-2.94923E+01	0.00000E+00	8.97310E-01	0.00000E+00	-3.01251E+01	9.00000E+01
4.16667E+00	3.05716E+01	-3.05627E+01	0.00000E+00	7.39023E-01	0.00000E+00	-2.95104E+01	9.00000E+01
4.20000E+00	3.16422E+01	-3.16366E+01	0.00000E+00	5.95568E-01	0.00000E+00	-2.88785E+01	9.00000E+01
4.23333E+00	3.27170E+01	-3.27137E+01	0.00000E+00	4.68855E-01	0.00000E+00	-2.82344E+01	9.00000E+01
4.26667E+00	3.37954E+01	-3.37936E+01	0.00000E+00	3.52852E-01	0.00000E+00	-2.75827E+01	9.00000E+01
4.30000E+00	3.48768E+01	-3.48759E+01	0.00000E+00	2.53509E-01	0.00000E+00	-2.69281E+01	9.00000E+01
4.33333E+00	3.59608E+01	-3.59604E+01	0.00000E+00	1.68683E-01	0.00000E+00	-2.62745E+01	9.00000E+01
4.36667E+00	3.70469E+01	-3.70468E+01	0.00000E+00	9.80702E-02	0.00000E+00	-2.56258E+01	9.00000E+01
4.40000E+00	3.81349E+01	-3.81349E+01	0.00000E+00	4.13198E-02	0.00000E+00	-2.49842E+01	9.00000E+01
4.43333E+00	3.92245E+01	-3.92245E+01	0.00000E+00	-2.28633E-03	0.00000E+00	-2.43532E+01	9.00000E+01
4.46667E+00	4.03154E+01	-4.03154E+01	0.00000E+00	-3.37186E-02	0.00000E+00	-2.37353E+01	9.00000E+01
4.50000E+00	4.14075E+01	-4.14075E+01	0.00000E+00	-5.41387E-02	0.00000E+00	-2.31320E+01	9.00000E+01
4.53333E+00	4.25006E+01	-4.25005E+01	0.00000E+00	-6.48402E-02	0.00000E+00	-2.25444E+01	9.00000E+01
4.56667E+00	4.35946E+01	-4.35945E+01	0.00000E+00	-5.71814E-02	0.00000E+00	-2.19731E+01	9.00000E+01
4.60000E+00	4.46895E+01	-4.46895E+01	0.00000E+00	-6.25293E-02	0.00000E+00	-2.14184E+01	9.00000E+01
4.63333E+00	4.57852E+01	-4.57852E+01	0.00000E+00	-5.22243E-02	0.00000E+00	-2.08805E+01	9.00000E+01
4.66667E+00	4.68817E+01	-4.68817E+01	0.00000E+00	-3.75446E-02	0.00000E+00	-2.03591E+01	9.00000E+01
4.70000E+00	4.79790E+01	-4.79790E+01	0.00000E+00	-1.96723E-02	0.00000E+00	-1.98540E+01	9.00000E+01
4.73333E+00	4.90770E+01	-4.90770E+01	0.00000E+00	3.31949E-04	0.00000E+00	-1.93548E+01	9.00000E+01
4.76667E+00	5.01758E+01	-5.01758E+01	0.00000E+00	2.15423E-02	0.00000E+00	-1.88911E+01	9.00000E+01
4.80000E+00	5.12752E+01	-5.12751E+01	0.00000E+00	4.31714E-02	0.00000E+00	-1.84325E+01	9.00000E+01
4.83333E+00	5.23752E+01	-5.23752E+01	0.00000E+00	6.45335E-02	0.00000E+00	-1.79985E+01	9.00000E+01
4.86667E+00	5.34759E+01	-5.34759E+01	0.00000E+00	8.51493E-02	0.00000E+00	-1.75589E+01	9.00000E+01
4.90000E+00	5.45773E+01	-5.45772E+01	0.00000E+00	1.04615E-01	0.00000E+00	-1.71432E+01	9.00000E+01
4.93333E+00	5.56792E+01	-5.56791E+01	0.00000E+00	1.26641E-01	0.00000E+00	-1.67410E+01	9.00000E+01
4.96667E+00	5.67817E+01	-5.67815E+01	0.00000E+00	1.39030E-01	0.00000E+00	-1.63519E+01	9.00000E+01
5.00000E+00	5.78848E+01	-5.78846E+01	0.00000E+00	1.53669E-01	0.00000E+00	-1.59756E+01	9.00000E+01
5.03333E+00	5.89884E+01	-5.89881E+01	0.00000E+00	1.66517E-01	0.00000E+00	-1.56116E+01	9.00000E+01
5.06667E+00	6.00925E+01	-6.00923E+01	0.00000E+00	1.77590E-01	0.00000E+00	-1.52598E+01	9.00000E+01
5.10000E+00	6.11972E+01	-6.11969E+01	0.00000E+00	1.86947E-01	0.00000E+00	-1.49196E+01	9.00000E+01
5.13333E+00	6.23024E+01	-6.23021E+01	0.00000E+00	1.94680E-01	0.00000E+00	-1.45907E+01	9.00000E+01
5.16667E+00	6.34080E+01	-6.34077E+01	0.00000E+00	2.00908E-01	0.00000E+00	-1.42729E+01	9.00000E+01
5.20000E+00	6.45142E+01	-6.45138E+01	0.00000E+00	2.05765E-01	0.00000E+00	-1.39657E+01	9.00000E+01
5.23333E+00	6.56208E+01	-6.56204E+01	0.00000E+00	2.09396E-01	0.00000E+00	-1.36689E+01	9.00000E+01
5.26667E+00	6.67279E+01	-6.67275E+01	0.00000E+00	2.11949E-01	0.00000E+00	-1.33822E+01	9.00000E+01
5.30000E+00	6.78334E+01	-6.78330E+01	0.00000E+00	2.13569E-01	0.00000E+00	-1.31051E+01	9.00000E+01
5.33333E+00	6.89434E+01	-6.89430E+01	0.00000E+00	2.14396E-01	0.00000E+00	-1.28375E+01	9.00000E+01
5.36667E+00	7.00518E+01	-7.00514E+01	0.00000E+00	2.14562E-01	0.00000E+00	-1.25790E+01	9.00000E+01
5.40000E+00	7.11606E+01	-7.11603E+01	0.00000E+00	2.14191E-01	0.00000E+00	-1.23294E+01	9.00000E+01
5.43333E+00	7.22699E+01	-7.22695E+01	0.00000E+00	2.13393E-01	0.00000E+00	-1.20883E+01	9.00000E+01
5.46667E+00	7.33795E+01	-7.33792E+01	0.00000E+00	2.12265E-01	0.00000E+00	-1.18555E+01	9.00000E+01
5.50000E+00	7.44896E+01	-7.44893E+01	0.00000E+00	2.10892E-01	0.00000E+00	-1.16308E+01	9.00000E+01
5.53333E+00	7.56001E+01	-7.55998E+01	0.00000E+00	2.09349E-01	0.00000E+00	-1.14138E+01	9.00000E+01
5.56667E+00	7.67109E+01	-7.67106E+01	0.00000E+00	2.07695E-01	0.00000E+00	-1.12043E+01	9.00000E+01
5.60000E+00	7.78221E+01	-7.78219E+01	0.00000E+00	2.05982E-01	0.00000E+00	-1.10020E+01	9.00000E+01
5.63333E+00	7.89338E+01	-7.89335E+01	0.00000E+00	2.04247E-01	0.00000E+00	-1.08068E+01	9.00000E+01
5.66667E+00	8.00457E+01	-8.00455E+01	0.00000E+00	2.02519E-01	0.00000E+00	-1.06183E+01	9.00000E+01
5.70000E+00	8.11581E+01	-8.11579E+01	0.00000E+00	2.00820E-01	0.00000E+00	-1.04363E+01	9.00000E+01
5.73333E+00	8.22708E+01	-8.22706E+01	0.00000E+00	1.99163E-01	0.00000E+00	-1.02606E+01	9.00000E+01
5.76667E+00	8.33839E+01	-8.33836E+01	0.00000E+00	1.97557E-01	0.00000E+00	-1.00910E+01	9.00000E+01



## 65

[illegible]

[illegible]

[illegible]

## boat30.out

Thu Oct 31 12:22:24 1991

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Boat 30 mph									
Request Number 32051									
Displacement of Marker 20005 relative to Marker 3200									
Time Mag X Y Z Yaw Pitch Roll									
0.00000E+00	1.40791E+02	1.40787E+02	0.00000E+00	-1.02100E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+01
3.33333E-02	1.39324E+02	1.39320E+02	0.00000E+00	-1.01054E+00	0.00000E+00	-4.79338E-02	9.00000E+01		
6.66667E-02	1.37858E+02	1.37854E+02	0.00000E+00	-9.85607E-01	0.00000E+00	-1.55993E-01	9.00000E+01		
1.00000E-01	1.36391E+02	1.36388E+02	0.00000E+00	-9.52362E-01	0.00000E+00	-2.92789E-01	9.00000E+01		
1.33333E-01	1.34925E+02	1.34922E+02	0.00000E+00	-9.14957E-01	0.00000E+00	-4.40091E-01	9.00000E+01		
1.66667E-01	1.33459E+02	1.33456E+02	0.00000E+00	-8.76028E-01	0.00000E+00	-5.88407E-01	9.00000E+01		
2.00000E-01	1.31983E+02	1.31990E+02	0.00000E+00	-8.37237E-01	0.00000E+00	-7.33209E-01	9.00000E+01		
2.33333E-01	1.30527E+02	1.30524E+02	0.00000E+00	-8.00121E-01	0.00000E+00	-8.71037E-01	9.00000E+01		
2.66667E-01	1.29061E+02	1.29058E+02	0.00000E+00	-7.65503E-01	0.00000E+00	-1.00100E+00	9.00000E+01		
3.00000E-01	1.27594E+02	1.27592E+02	0.00000E+00	-7.33791E-01	0.00000E+00	-1.12335E+00	9.00000E+01		
3.33333E-01	1.26128E+02	1.26126E+02	0.00000E+00	-7.05216E-01	0.00000E+00	-1.23864E+00	9.00000E+01		
3.66667E-01	1.24662E+02	1.24660E+02	0.00000E+00	-6.79758E-01	0.00000E+00	-1.34755E+00	9.00000E+01		
4.00000E-01	1.23196E+02	1.23194E+02	0.00000E+00	-6.57349E-01	0.00000E+00	-1.45068E+00	9.00000E+01		
4.33333E-01	1.21730E+02	1.21729E+02	0.00000E+00	-6.37833E-01	0.00000E+00	-1.54857E+00	9.00000E+01		
4.66667E-01	1.20248E+02	1.20246E+02	0.00000E+00	-6.20991E-01	0.00000E+00	-1.64181E+00	9.00000E+01		
5.00000E-01	1.18798E+02	1.18797E+02	0.00000E+00	-6.06567E-01	0.00000E+00	-1.73090E+00	9.00000E+01		
5.33333E-01	1.17332E+02	1.17331E+02	0.00000E+00	-5.94295E-01	0.00000E+00	-1.81631E+00	9.00000E+01		

5.66667E-01	1.15866E+02	1.15865E+02	0.00000E+00	-5.83845E-01	0.00000E+00	-1.89852E+00	9.00000E+01
6.00000E-01	1.14400E+02	1.14399E+02	0.00000E+00	-5.74914E-01	0.00000E+00	-1.97793E+00	9.00000E+01
6.33333E-01	1.12934E+02	1.12933E+02	0.00000E+00	-5.67223E-01	0.00000E+00	-2.05485E+00	9.00000E+01
6.66667E-01	1.11468E+02	1.11467E+02	0.00000E+00	-5.60510E-01	0.00000E+00	-2.12954E+00	9.00000E+01
7.00000E-01	1.10002E+02	1.10001E+02	0.00000E+00	-5.54534E-01	0.00000E+00	-2.20222E+00	9.00000E+01
7.33333E-01	1.08536E+02	1.08534E+02	0.00000E+00	-5.49093E-01	0.00000E+00	-2.27306E+00	9.00000E+01
7.66667E-01	1.07070E+02	1.07068E+02	0.00000E+00	-5.44012E-01	0.00000E+00	-2.34219E+00	9.00000E+01
8.00000E-01	1.05604E+02	1.05602E+02	0.00000E+00	-5.39144E-01	0.00000E+00	-2.40972E+00	9.00000E+01
8.33333E-01	1.04136E+02	1.04134E+02	0.00000E+00	-5.34372E-01	0.00000E+00	-2.47572E+00	9.00000E+01
8.66667E-01	1.02672E+02	1.02670E+02	0.00000E+00	-5.29605E-01	0.00000E+00	-2.54026E+00	9.00000E+01
9.00000E-01	1.01204E+02	1.01202E+02	0.00000E+00	-5.24777E-01	0.00000E+00	-2.60337E+00	9.00000E+01
9.33333E-01	9.97396E+01	9.97383E+01	0.00000E+00	-5.19843E-01	0.00000E+00	-2.66508E+00	9.00000E+01
9.66667E-01	9.82736E+01	9.82722E+01	0.00000E+00	-5.14781E-01	0.00000E+00	-2.72539E+00	9.00000E+01
1.00000E+00	9.68075E+01	9.68062E+01	0.00000E+00	-5.09580E-01	0.00000E+00	-2.78433E+00	9.00000E+01
1.03333E+00	9.53415E+01	9.53401E+01	0.00000E+00	-5.04395E-01	0.00000E+00	-2.84191E+00	9.00000E+01
1.06667E+00	9.38754E+01	9.38741E+01	0.00000E+00	-4.99495E-01	0.00000E+00	-2.89813E+00	9.00000E+01
1.10000E+00	9.24093E+01	9.24080E+01	0.00000E+00	-4.95061E-01	0.00000E+00	-2.95303E+00	9.00000E+01
1.13333E+00	9.09433E+01	9.09419E+01	0.00000E+00	-4.91073E-01	0.00000E+00	-3.00668E+00	9.00000E+01
1.16667E+00	8.94772E+01	8.94759E+01	0.00000E+00	-4.87406E-01	0.00000E+00	-3.05912E+00	9.00000E+01
1.20000E+00	8.80111E+01	8.80098E+01	0.00000E+00	-4.83918E-01	0.00000E+00	-3.11043E+00	9.00000E+01
1.23333E+00	8.65450E+01	8.65437E+01	0.00000E+00	-4.80478E-01	0.00000E+00	-3.16066E+00	9.00000E+01
1.26667E+00	8.50789E+01	8.50776E+01	0.00000E+00	-4.76973E-01	0.00000E+00	-3.20984E+00	9.00000E+01
1.30000E+00	8.36115E+01	8.36115E+01	0.00000E+00	-4.73305E-01	0.00000E+00	-3.25799E+00	9.00000E+01
1.33333E+00	8.21467E+01	8.21454E+01	0.00000E+00	-4.69395E-01	0.00000E+00	-3.30512E+00	9.00000E+01
1.36667E+00	8.06806E+01	8.06792E+01	0.00000E+00	-4.65172E-01	0.00000E+00	-3.35123E+00	9.00000E+01
1.40000E+00	7.92145E+01	7.92131E+01	0.00000E+00	-4.60589E-01	0.00000E+00	-3.39629E+00	9.00000E+01
1.43333E+00	7.77483E+01	7.77470E+01	0.00000E+00	-4.56617E-01	0.00000E+00	-3.44030E+00	9.00000E+01
1.46667E+00	7.62822E+01	7.62808E+01	0.00000E+00	-4.50248E-01	0.00000E+00	-3.48321E+00	9.00000E+01
1.50000E+00	7.48160E+01	7.48147E+01	0.00000E+00	-4.44494E-01	0.00000E+00	-3.52500E+00	9.00000E+01
1.53333E+00	7.33498E+01	7.33485E+01	0.00000E+00	-4.38386E-01	0.00000E+00	-3.56565E+00	9.00000E+01
1.56667E+00	7.18837E+01	7.18824E+01	0.00000E+00	-4.31971E-01	0.00000E+00	-3.60512E+00	9.00000E+01
1.60000E+00	7.04162E+01	7.04162E+01	0.00000E+00	-4.25315E-01	0.00000E+00	-3.64340E+00	9.00000E+01
1.63333E+00	6.89513E+01	6.89500E+01	0.00000E+00	-4.18496E-01	0.00000E+00	-3.68047E+00	9.00000E+01
1.66667E+00	6.74850E+01	6.74838E+01	0.00000E+00	-4.11601E-01	0.00000E+00	-3.71633E+00	9.00000E+01
1.70000E+00	6.60188E+01	6.60176E+01	0.00000E+00	-4.04724E-01	0.00000E+00	-3.75098E+00	9.00000E+01
1.73333E+00	6.45526E+01	6.45513E+01	0.00000E+00	-3.97962E-01	0.00000E+00	-3.78444E+00	9.00000E+01
1.76667E+00	6.30863E+01	6.30851E+01	0.00000E+00	-3.91411E-01	0.00000E+00	-3.81673E+00	9.00000E+01
1.80000E+00	6.16201E+01	6.16189E+01	0.00000E+00	-3.85163E-01	0.00000E+00	-3.84788E+00	9.00000E+01
1.83333E+00	6.01538E+01	6.01526E+01	0.00000E+00	-3.79299E-01	0.00000E+00	-3.87795E+00	9.00000E+01
1.86667E+00	5.86875E+01	5.86863E+01	0.00000E+00	-3.73893E-01	0.00000E+00	-3.90697E+00	9.00000E+01
1.90000E+00	5.72212E+01	5.72200E+01	0.00000E+00	-3.69003E-01	0.00000E+00	-3.93503E+00	9.00000E+01
1.93333E+00	5.57549E+01	5.57537E+01	0.00000E+00	-3.64671E-01	0.00000E+00	-3.96217E+00	9.00000E+01
1.96667E+00	5.42886E+01	5.42874E+01	0.00000E+00	-3.60922E-01	0.00000E+00	-3.98847E+00	9.00000E+01
2.00000E+00	5.28223E+01	5.28211E+01	0.00000E+00	-3.57766E-01	0.00000E+00	-4.01399E+00	9.00000E+01
2.03333E+00	5.13560E+01	5.13548E+01	0.00000E+00	-3.55198E-01	0.00000E+00	-4.03876E+00	9.00000E+01
2.06667E+00	4.98897E+01	4.98884E+01	0.00000E+00	-3.53193E-01	0.00000E+00	-4.06286E+00	9.00000E+01
2.10000E+00	4.84234E+01	4.84221E+01	0.00000E+00	-3.51706E-01	0.00000E+00	-4.08635E+00	9.00000E+01
2.13333E+00	4.69571E+01	4.69557E+01	0.00000E+00	-3.50673E-01	0.00000E+00	-4.10931E+00	9.00000E+01
2.16667E+00	4.54907E+01	4.54894E+01	0.00000E+00	-3.50018E-01	0.00000E+00	-4.13180E+00	9.00000E+01
2.20000E+00	4.40244E+01	4.40230E+01	0.00000E+00	-3.49654E-01	0.00000E+00	-4.15388E+00	9.00000E+01
2.23333E+00	4.25581E+01	4.25567E+01	0.00000E+00	-3.49485E-01	0.00000E+00	-4.17560E+00	9.00000E+01
2.26667E+00	4.10903E+01	4.10903E+01	0.00000E+00	-3.49412E-01	0.00000E+00	-4.19700E+00	9.00000E+01
2.30000E+00	3.96255E+01	3.96239E+01	0.00000E+00	-3.49337E-01	0.00000E+00	-4.21811E+00	9.00000E+01
2.33333E+00	3.81592E+01	3.81576E+01	0.00000E+00	-3.49164E-01	0.00000E+00	-4.23894E+00	9.00000E+01

2.36667E+00	3.66929E+01	3.66912E+01	0.00000E+00	-3.48805E-01	0.00000E+00	-4.25949E+00	9.00000E+01
2.40000E+00	3.52266E+01	3.52248E+01	0.00000E+00	-3.48179E-01	0.00000E+00	-4.27976E+00	9.00000E+01
2.43333E+00	3.37602E+01	3.37585E+01	0.00000E+00	-3.47220E-01	0.00000E+00	-4.29972E+00	9.00000E+01
2.46667E+00	3.22919E+01	3.22921E+01	0.00000E+00	-3.45879E-01	0.00000E+00	-4.31935E+00	9.00000E+01
2.50000E+00	3.08276E+01	3.08257E+01	0.00000E+00	-3.44123E-01	0.00000E+00	-4.33862E+00	9.00000E+01
2.53333E+00	2.93613E+01	2.93593E+01	0.00000E+00	-3.41938E-01	0.00000E+00	-4.35748E+00	9.00000E+01
2.56667E+00	2.78950E+01	2.78929E+01	0.00000E+00	-3.39328E-01	0.00000E+00	-4.37589E+00	9.00000E+01
2.60000E+00	2.64286E+01	2.64265E+01	0.00000E+00	-3.36324E-01	0.00000E+00	-4.39380E+00	9.00000E+01
2.63333E+00	2.49623E+01	2.49601E+01	0.00000E+00	-3.32951E-01	0.00000E+00	-4.4118E+00	9.00000E+01
2.66667E+00	2.34960E+01	2.34937E+01	0.00000E+00	-3.29269E-01	0.00000E+00	-4.42798E+00	9.00000E+01
2.70000E+00	2.20296E+01	2.20272E+01	0.00000E+00	-3.25345E-01	0.00000E+00	-4.44419E+00	9.00000E+01
2.73333E+00	2.05633E+01	2.05608E+01	0.00000E+00	-3.21260E-01	0.00000E+00	-4.45975E+00	9.00000E+01
2.76667E+00	1.90970E+01	1.90944E+01	0.00000E+00	-3.17099E-01	0.00000E+00	-4.47468E+00	9.00000E+01
2.80000E+00	1.76307E+01	1.76279E+01	0.00000E+00	-3.12952E-01	0.00000E+00	-4.48894E+00	9.00000E+01
2.83333E+00	1.61644E+01	1.61614E+01	0.00000E+00	-3.08910E-01	0.00000E+00	-4.50255E+00	9.00000E+01
2.86667E+00	1.46981E+01	1.46950E+01	0.00000E+00	-3.05059E-01	0.00000E+00	-4.51553E+00	9.00000E+01
2.90000E+00	1.32319E+01	1.32285E+01	0.00000E+00	-3.01483E-01	0.00000E+00	-4.52788E+00	9.00000E+01
2.93333E+00	1.17658E+01	1.17620E+01	0.00000E+00	-2.98256E-01	0.00000E+00	-4.53965E+00	9.00000E+01
2.96667E+00	1.02997E+01	1.02955E+01	0.00000E+00	-2.95440E-01	0.00000E+00	-4.55087E+00	9.00000E+01
3.00000E+00	8.83386E+00	8.82900E+00	0.00000E+00	-2.93079E-01	0.00000E+00	-4.56159E+00	9.00000E+01
3.03333E+00	7.36824E+00	7.36249E+00	0.00000E+00	-2.91205E-01	0.00000E+00	-4.57187E+00	9.00000E+01
3.06667E+00	5.90309E+00	5.89597E+00	0.00000E+00	-2.89832E-01	0.00000E+00	-4.58176E+00	9.00000E+01
3.10000E+00	4.43986E+00	4.42945E+00	0.00000E+00	-2.88958E-01	0.00000E+00	-4.59133E+00	9.00000E+01
3.13333E+00	2.97828E+00	2.96447E+00	0.00000E+00	-2.86505E-01	0.00000E+00	-4.60579E+00	9.00000E+01
3.16667E+00	1.55296E+00	1.53409E+00	0.00000E+00	-2.84136E-01	0.00000E+00	-4.71147E+00	9.00000E+01
3.20000E+00	2.38327E-01	1.08270E-01	0.00000E+00	-2.12314E-01	0.00000E+00	-4.74291E+00	9.00000E+01
3.23333E+00	1.33946E+00	-1.32304E+00	0.00000E+00	-2.09053E-01	0.00000E+00	-4.70954E+00	9.00000E+01
3.26667E+00	2.75656E+00	-2.74862E+00	0.00000E+00	-2.03082E-01	0.00000E+00	-4.68547E+00	9.00000E+01
3.30000E+00	4.16951E+00	-4.16431E+00	0.00000E+00	-2.00809E-01	0.00000E+00	-4.70092E+00	9.00000E+01
3.33333E+00	5.45957E+00	-5.45820E+00	0.00000E+00	-1.22018E-01	0.00000E+00	-6.03910E+00	9.00000E+01
3.36667E+00	6.44940E+00	-6.44519E+00	0.00000E+00	2.32924E-01	0.00000E+00	-1.12162E+01	9.00000E+01
3.40000E+00	7.25624E+00	-7.21490E+00	0.00000E+00	7.7348E-01	0.00000E+00	-1.89897E+01	9.00000E+01
3.43333E+00	8.05370E+00	-7.96022E+00	0.00000E+00	1.22335E+00	0.00000E+00	-2.56629E+01	9.00000E+01
3.46667E+00	8.88651E+00	-8.75231E+00	0.00000E+00	1.53853E+00	0.00000E+00	-3.04751E+01	9.00000E+01
3.50000E+00	9.75052E+00	-9.59009E+00	0.00000E+00	1.76148E+00	0.00000E+00	-3.39278E+01	9.00000E+01
3.53333E+00	1.06425E+01	-1.04678E+01	0.00000E+00	1.92001E+00	0.00000E+00	-3.63619E+01	9.00000E+01
3.56667E+00	1.15644E+01	-1.13833E+01	0.00000E+00	2.03851E+00	0.00000E+00	-3.78797E+01	9.00000E+01
3.60000E+00	1.25190E+01	-1.23347E+01	0.00000E+00	2.13988E+00	0.00000E+00	-3.85228E+01	9.00000E+01
3.63333E+00	1.35075E+01	-1.33208E+01	0.00000E+00	2.23763E+00	0.00000E+00	-3.83880E+01	9.00000E+01
3.66667E+00	1.45152E+01	-1.43292E+01	0.00000E+00	2.31600E+00	0.00000E+00	-3.78771E+01	9.00000E+01
3.70000E+00	1.55246E+01	-1.53447E+01	0.00000E+00	2.35700E+00	0.00000E+00	-3.72916E+01	9.00000E+01
3.73333E+00	1.65328E+01	-1.63638E+01	0.00000E+00	2.35775E+00	0.00000E+00	-3.66581E+01	9.00000E+01
3.76667E+00	1.75406E+01	-1.73864E+01	0.00000E+00	2.32118E+00	0.00000E+00	-3.59659E+01	9.00000E+01
3.80000E+00	1.85481E+01	-1.84111E+01	0.00000E+00	2.25054E+00	0.00000E+00	-3.52284E+01	9.00000E+01
3.83333E+00	1.95541E+01	-1.94357E+01	0.00000E+00	2.14846E+00	0.00000E+00	-3.44785E+01	9.00000E+01
3.86667E+00	2.05538E+01	-2.04545E+01	0.00000E+00	2.01775E+00	0.00000E+00	-3.38717E+01	9.00000E+01
3.90000E+00	2.15574E+01	-2.14764E+01	0.00000E+00	1.86714E+00	0.00000E+00	-3.34803E+01	9.00000E+01
3.93333E+00	2.25716E+01	-2.25074E+01	0.00000E+00	1.70110E+00	0.00000E+00	-3.31383E+01	9.00000E+01
3.96667E+00	2.35949E+01	-2.35462E+01	0.00000E+00	1.51524E+00	0.00000E+00	-3.27476E+01	9.00000E+01
4.00000E+00	2.46262E+01	-2.45915E+01	0.00000E+00	1.30528E+00	0.00000E+00	-3.23045E+01	9.00000E+01
4.03333E+00	2.56661E+01	-2.56430E+01	0.00000E+00	1.08852E+00	0.00000E+00	-3.18137E+01	9.00000E+01
4.06667E+00	2.67147E+01	-2.67000E+01	0.00000E+00	8.84128E-01	0.00000E+00	-3.12828E+01	9.00000E+01
4.10000E+00	2.77706E+01	-2.77619E+01	0.00000E+00	6.95654E-01	0.00000E+00	-3.07180E+01	9.00000E+01
4.13333E+00	2.88328E+01	-2.88281E+01	0.00000E+00	5.22901E-01	0.00000E+00	-3.01251E+01	9.00000E+01
4.16667E+00	2.99003E+01	-2.98981E+01	0.00000E+00	3.65342E-01	0.00000E+00	-2.95104E+01	9.00000E+01

4.20000E+00	3.09723E+01	-3.09715E+01	0.00000E+00	2.22775E-01	0.00000E+00	-2.88785E+01	9.00000E+01
4.23333E+00	3.20481E+01	-3.20480E+01	0.00000E+00	9.50970E-02	0.00000E+00	-2.82344E+01	9.00000E+01
4.26667E+00	3.31272E+01	-3.31272E+01	0.00000E+00	-1.77460E-02	0.00000E+00	-2.75827E+01	9.00000E+01
4.30000E+00	3.42091E+01	-3.42089E+01	0.00000E+00	-1.15830E-01	0.00000E+00	-2.69281E+01	9.00000E+01
4.33333E+00	3.52932E+01	-3.52926E+01	0.00000E+00	-1.99325E-01	0.00000E+00	-2.62745E+01	9.00000E+01
4.36667E+00	3.63793E+01	-3.63783E+01	0.00000E+00	-2.68562E-01	0.00000E+00	-2.56258E+01	9.00000E+01
4.40000E+00	3.74670E+01	-3.74656E+01	0.00000E+00	-3.23909E-01	0.00000E+00	-2.49842E+01	9.00000E+01
4.43333E+00	3.85562E+01	-3.85545E+01	0.00000E+00	-3.66112E-01	0.00000E+00	-2.43532E+01	9.00000E+01
4.46667E+00	3.96466E+01	-3.96446E+01	0.00000E+00	-3.96157E-01	0.00000E+00	-2.37353E+01	9.00000E+01
4.50000E+00	4.07380E+01	-4.07359E+01	0.00000E+00	-4.15217E-01	0.00000E+00	-2.31320E+01	9.00000E+01
4.53333E+00	4.18304E+01	-4.18282E+01	0.00000E+00	-4.24590E-01	0.00000E+00	-2.25444E+01	9.00000E+01
4.56667E+00	4.29237E+01	-4.29216E+01	0.00000E+00	-4.25635E-01	0.00000E+00	-2.19731E+01	9.00000E+01
4.60000E+00	4.40178E+01	-4.40158E+01	0.00000E+00	-4.19721E-01	0.00000E+00	-2.14184E+01	9.00000E+01
4.63333E+00	4.51128E+01	-4.51109E+01	0.00000E+00	-4.08184E-01	0.00000E+00	-2.08805E+01	9.00000E+01
4.66667E+00	4.62085E+01	-4.62068E+01	0.00000E+00	-3.92301E-01	0.00000E+00	-2.03591E+01	9.00000E+01
4.70000E+00	4.73050E+01	-4.73035E+01	0.00000E+00	-3.73251E-01	0.00000E+00	-1.98540E+01	9.00000E+01
4.73333E+00	4.84022E+01	-4.84009E+01	0.00000E+00	-3.52091E-01	0.00000E+00	-1.93648E+01	9.00000E+01
4.76667E+00	4.95001E+01	-4.94990E+01	0.00000E+00	-3.29744E-01	0.00000E+00	-1.88911E+01	9.00000E+01
4.80000E+00	5.05988E+01	-5.05978E+01	0.00000E+00	-3.06965E-01	0.00000E+00	-1.84325E+01	9.00000E+01
4.83333E+00	5.16981E+01	-5.16973E+01	0.00000E+00	-2.84528E-01	0.00000E+00	-1.79885E+01	9.00000E+01
4.86667E+00	5.27981E+01	-5.27974E+01	0.00000E+00	-2.62825E-01	0.00000E+00	-1.75589E+01	9.00000E+01
4.90000E+00	5.38987E+01	-5.38982E+01	0.00000E+00	-2.42283E-01	0.00000E+00	-1.71432E+01	9.00000E+01
4.93333E+00	5.50000E+01	-5.49995E+01	0.00000E+00	-2.23195E-01	0.00000E+00	-1.67410E+01	9.00000E+01
4.96667E+00	5.61018E+01	-5.61015E+01	0.00000E+00	-2.05756E-01	0.00000E+00	-1.63519E+01	9.00000E+01
5.00000E+00	5.72043E+01	-5.72040E+01	0.00000E+00	-1.90080E-01	0.00000E+00	-1.59756E+01	9.00000E+01
5.03333E+00	5.83073E+01	-5.83070E+01	0.00000E+00	-1.76207E-01	0.00000E+00	-1.56116E+01	9.00000E+01
5.06667E+00	5.94109E+01	-5.94106E+01	0.00000E+00	-1.64124E-01	0.00000E+00	-1.52598E+01	9.00000E+01
5.10000E+00	6.05150E+01	-6.05148E+01	0.00000E+00	-1.53770E-01	0.00000E+00	-1.49196E+01	9.00000E+01
5.13333E+00	6.16196E+01	-6.16194E+01	0.00000E+00	-1.45053E-01	0.00000E+00	-1.45907E+01	9.00000E+01
5.16667E+00	6.27248E+01	-6.27246E+01	0.00000E+00	-1.37856E-01	0.00000E+00	-1.42729E+01	9.00000E+01
5.20000E+00	6.38304E+01	-6.38303E+01	0.00000E+00	-1.32045E-01	0.00000E+00	-1.39657E+01	9.00000E+01
5.23333E+00	6.49365E+01	-6.49364E+01	0.00000E+00	-1.27474E-01	0.00000E+00	-1.36689E+01	9.00000E+01
5.26667E+00	6.60432E+01	-6.60430E+01	0.00000E+00	-1.23997E-01	0.00000E+00	-1.33822E+01	9.00000E+01
5.30000E+00	6.71502E+01	-6.71501E+01	0.00000E+00	-1.21470E-01	0.00000E+00	-1.31051E+01	9.00000E+01
5.33333E+00	6.82578E+01	-6.82577E+01	0.00000E+00	-1.19751E-01	0.00000E+00	-1.28375E+01	9.00000E+01
5.36667E+00	6.93658E+01	-6.93657E+01	0.00000E+00	-1.18709E-01	0.00000E+00	-1.25790E+01	9.00000E+01
5.40000E+00	7.04742E+01	-7.04741E+01	0.00000E+00	-1.18221E-01	0.00000E+00	-1.23294E+01	9.00000E+01
5.43333E+00	7.15830E+01	-7.15829E+01	0.00000E+00	-1.18177E-01	0.00000E+00	-1.20883E+01	9.00000E+01
5.46667E+00	7.26923E+01	-7.26922E+01	0.00000E+00	-1.18480E-01	0.00000E+00	-1.18555E+01	9.00000E+01
5.50000E+00	7.38019E+01	-7.38019E+01	0.00000E+00	-1.19045E-01	0.00000E+00	-1.16308E+01	9.00000E+01
5.53333E+00	7.49121E+01	-7.49120E+01	0.00000E+00	-1.19797E-01	0.00000E+00	-1.14138E+01	9.00000E+01
5.56667E+00	7.60226E+01	-7.60225E+01	0.00000E+00	-1.20676E-01	0.00000E+00	-1.12043E+01	9.00000E+01
5.60000E+00	7.71335E+01	-7.71334E+01	0.00000E+00	-1.21633E-01	0.00000E+00	-1.10020E+01	9.00000E+01
5.63333E+00	7.82447E+01	-7.82446E+01	0.00000E+00	-1.22627E-01	0.00000E+00	-1.08068E+01	9.00000E+01
5.66667E+00	7.93564E+01	-7.93563E+01	0.00000E+00	-1.23631E-01	0.00000E+00	-1.06183E+01	9.00000E+01
5.70000E+00	8.04684E+01	-8.04683E+01	0.00000E+00	-1.24622E-01	0.00000E+00	-1.04363E+01	9.00000E+01
5.73333E+00	8.15808E+01	-8.15807E+01	0.00000E+00	-1.25588E-01	0.00000E+00	-1.02606E+01	9.00000E+01
5.76667E+00	8.26936E+01	-8.26935E+01	0.00000E+00	-1.26518E-01	0.00000E+00	-1.00910E+01	9.00000E+01
5.80000E+00	8.38067E+01	-8.38066E+01	0.00000E+00	-1.27410E-01	0.00000E+00	-9.92719E+00	9.00000E+01
5.83333E+00	8.49201E+01	-8.49201E+01	0.00000E+00	-1.28265E-01	0.00000E+00	-9.76904E+00	9.00000E+01
5.86667E+00	8.60340E+01	-8.60339E+01	0.00000E+00	-1.29086E-01	0.00000E+00	-9.61633E+00	9.00000E+01
5.90000E+00	8.71481E+01	-8.71480E+01	0.00000E+00	-1.29879E-01	0.00000E+00	-9.46884E+00	9.00000E+01
5.93333E+00	8.82626E+01	-8.82625E+01	0.00000E+00	-1.30651E-01	0.00000E+00	-9.32640E+00	9.00000E+01
5.96667E+00	8.93774E+01	-8.93773E+01	0.00000E+00	-1.31410E-01	0.00000E+00	-9.18881E+00	9.00000E+01

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[illegible]





[illegible]

question Number	32061									
	Time	Mag	2006 relative to Marker				Z	Yaw	Pitch	Roll
			Displacement of Marker	X	Y	3200				
0.00000E+00	1.41631E+02	1.41626E+02	0.00000E+00	-1.14900E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E-02	1.40164E+02	1.40159E+02	0.00000E+00	-1.13924E+00	0.00000E+00	-4.79338E-02	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
6.66667E-01	1.38693E+02	1.38693E+02	0.00000E+00	-1.11589E+00	0.00000E+00	-1.55993E-01	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
1.37231E+02	1.37226E+02	1.37226E+02	0.00000E+00	-1.08465E+00	0.00000E+00	-2.92789E-01	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
1.33333E-01	1.35764E+02	1.35760E+02	0.00000E+00	-1.04940E+00	0.00000E+00	-4.40091E-01	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
1.66667E-01	1.34297E+02	1.34294E+02	0.00000E+00	-1.01264E+00	0.00000E+00	-5.88407E-01	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
2.00000E-01	1.32831E+02	1.32827E+02	0.00000E+00	-9.75963E-01	0.00000E+00	-7.33209E-01	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
2.33333E-01	1.31364E+02	1.31361E+02	0.00000E+00	-9.40861E-01	0.00000E+00	-8.71037E-01	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
2.66667E-01	1.29895E+02	1.29895E+02	0.00000E+00	-9.08141E-01	0.00000E+00	-1.00100E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
3.00000E-01	1.28432E+02	1.28429E+02	0.00000E+00	-8.78215E-01	0.00000E+00	-1.12335E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
3.33333E-01	1.26965E+02	1.26962E+02	0.00000E+00	-8.51322E-01	0.00000E+00	-1.23864E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
3.66667E-01	1.25499E+02	1.25496E+02	0.00000E+00	-8.27453E-01	0.00000E+00	-1.34755E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
4.00000E-01	1.24033E+02	1.24030E+02	0.00000E+00	-8.06548E-01	0.00000E+00	-1.45068E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
4.33333E-01	1.22566E+02	1.22564E+02	0.00000E+00	-7.88460E-01	0.00000E+00	-1.54857E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
4.66667E-01	1.21100E+02	1.21098E+02	0.00000E+00	-7.72976E-01	0.00000E+00	-1.64181E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
5.00000E-01	1.19634E+02	1.19631E+02	0.00000E+00	-7.59851E-01	0.00000E+00	-1.73090E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
5.33333E-01	1.18167E+02	1.18165E+02	0.00000E+00	-7.48823E-01	0.00000E+00	-1.81631E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
5.66667E-01	1.16701E+02	1.16699E+02	0.00000E+00	-7.39570E-01	0.00000E+00	-1.89852E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
6.00000E-01	1.15235E+02	1.15233E+02	0.00000E+00	-7.31796E-01	0.00000E+00	-1.97793E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
6.33333E-01	1.13769E+02	1.13766E+02	0.00000E+00	-7.25224E-01	0.00000E+00	-2.05485E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
6.66667E-01	1.12302E+02	1.12300E+02	0.00000E+00	-7.19598E-01	0.00000E+00	-2.12954E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
7.00000E-01	1.10834E+02	1.10834E+02	0.00000E+00	-7.14679E-01	0.00000E+00	-2.20222E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00
7.33333E-01	1.09370E+02	1.09368E+02	0.00000E+00	-7.10269E-01	0.00000E+00	-2.27306E+00	9.00000E+01	0.00000E+00	0.00000E+00	0.00000E+00

7.66667E-01	1.07904E+02	1.07902E+02	0.00000E+00	-7.06193E-01	0.00000E+00	-2.34219E+00	9.00000E+01
8.00000E-01	1.06438E+02	1.06435E+02	0.00000E+00	-7.02307E-01	0.00000E+00	-2.40972E+00	9.00000E+01
8.33333E-01	1.04971E+02	1.04969E+02	0.00000E+00	-6.98494E-01	0.00000E+00	-2.47572E+00	9.00000E+01
8.66667E-01	1.03505E+02	1.03503E+02	0.00000E+00	-6.94665E-01	0.00000E+00	-2.54026E+00	9.00000E+01
9.00000E-01	1.02039E+02	1.02037E+02	0.00000E+00	-6.90754E-01	0.00000E+00	-2.60337E+00	9.00000E+01
9.33333E-01	1.00573E+02	1.00570E+02	0.00000E+00	-6.86716E-01	0.00000E+00	-2.66508E+00	9.00000E+01
9.66667E-01	9.91066E+01	9.91042E+01	0.00000E+00	-6.82530E-01	0.00000E+00	-2.72539E+00	9.00000E+01
1.00000E+00	9.76403E+01	9.76380E+01	0.00000E+00	-6.78185E-01	0.00000E+00	-2.78433E+00	9.00000E+01
1.03333E+00	9.61741E+01	9.61718E+01	0.00000E+00	-6.73835E-01	0.00000E+00	-2.84191E+00	9.00000E+01
1.06667E+00	9.47079E+01	9.47055E+01	0.00000E+00	-6.69752E-01	0.00000E+00	-2.89813E+00	9.00000E+01
1.10000E+00	9.32417E+01	9.32393E+01	0.00000E+00	-6.66115E-01	0.00000E+00	-2.95303E+00	9.00000E+01
1.13333E+00	9.17755E+01	9.17731E+01	0.00000E+00	-6.62905E-01	0.00000E+00	-3.00688E+00	9.00000E+01
1.16667E+00	9.03092E+01	9.03068E+01	0.00000E+00	-6.59998E-01	0.00000E+00	-3.05912E+00	9.00000E+01
1.20000E+00	8.88430E+01	8.88406E+01	0.00000E+00	-6.57254E-01	0.00000E+00	-3.11043E+00	9.00000E+01
1.23333E+00	8.73768E+01	8.73743E+01	0.00000E+00	-6.54542E-01	0.00000E+00	-3.16066E+00	9.00000E+01
1.26667E+00	8.59106E+01	8.59081E+01	0.00000E+00	-6.51750E-01	0.00000E+00	-3.20984E+00	9.00000E+01
1.30000E+00	8.4443E+01	8.44418E+01	0.00000E+00	-6.48781E-01	0.00000E+00	-3.25799E+00	9.00000E+01
1.33333E+00	8.29781E+01	8.29756E+01	0.00000E+00	-6.45553E-01	0.00000E+00	-3.30512E+00	9.00000E+01
1.36667E+00	8.15119E+01	8.15093E+01	0.00000E+00	-6.41998E-01	0.00000E+00	-3.35123E+00	9.00000E+01
1.40000E+00	8.00456E+01	8.00431E+01	0.00000E+00	-6.38068E-01	0.00000E+00	-3.39629E+00	9.00000E+01
1.43333E+00	7.85793E+01	7.85768E+01	0.00000E+00	-6.33733E-01	0.00000E+00	-3.44030E+00	9.00000E+01
1.46667E+00	7.71131E+01	7.71105E+01	0.00000E+00	-6.29886E-01	0.00000E+00	-3.48321E+00	9.00000E+01
1.50000E+00	7.56468E+01	7.56442E+01	0.00000E+00	-6.23837E-01	0.00000E+00	-3.52500E+00	9.00000E+01
1.53333E+00	7.41805E+01	7.41780E+01	0.00000E+00	-6.18317E-01	0.00000E+00	-3.56565E+00	9.00000E+01
1.56667E+00	7.27142E+01	7.27117E+01	0.00000E+00	-6.12474E-01	0.00000E+00	-3.60512E+00	9.00000E+01
1.60000E+00	7.12479E+01	7.12454E+01	0.00000E+00	-6.06372E-01	0.00000E+00	-3.64340E+00	9.00000E+01
1.63333E+00	6.97816E+01	6.97791E+01	0.00000E+00	-6.00089E-01	0.00000E+00	-3.68047E+00	9.00000E+01
1.66667E+00	6.83153E+01	6.83127E+01	0.00000E+00	-5.93713E-01	0.00000E+00	-3.71633E+00	9.00000E+01
1.70000E+00	6.68490E+01	6.68464E+01	0.00000E+00	-5.87338E-01	0.00000E+00	-3.75098E+00	9.00000E+01
1.73333E+00	6.53827E+01	6.53801E+01	0.00000E+00	-5.81060E-01	0.00000E+00	-3.78444E+00	9.00000E+01
1.76667E+00	6.39137E+01	6.39137E+01	0.00000E+00	-5.74976E-01	0.00000E+00	-3.81673E+00	9.00000E+01
1.80000E+00	6.24500E+01	6.24474E+01	0.00000E+00	-5.69178E-01	0.00000E+00	-3.84788E+00	9.00000E+01
1.83333E+00	6.09836E+01	6.09810E+01	0.00000E+00	-5.63749E-01	0.00000E+00	-3.87795E+00	9.00000E+01
1.86667E+00	5.95173E+01	5.95146E+01	0.00000E+00	-5.58763E-01	0.00000E+00	-3.90697E+00	9.00000E+01
1.90000E+00	5.80509E+01	5.80483E+01	0.00000E+00	-5.54278E-01	0.00000E+00	-3.93503E+00	9.00000E+01
1.93333E+00	5.65845E+01	5.65819E+01	0.00000E+00	-5.50338E-01	0.00000E+00	-3.96217E+00	9.00000E+01
1.96667E+00	5.51182E+01	5.51155E+01	0.00000E+00	-5.46969E-01	0.00000E+00	-3.98847E+00	9.00000E+01
2.00000E+00	5.36518E+01	5.36491E+01	0.00000E+00	-5.44182E-01	0.00000E+00	-4.01399E+00	9.00000E+01
2.03333E+00	5.21855E+01	5.21827E+01	0.00000E+00	-5.41972E-01	0.00000E+00	-4.03876E+00	9.00000E+01
2.06667E+00	5.07191E+01	5.07163E+01	0.00000E+00	-5.40316E-01	0.00000E+00	-4.06286E+00	9.00000E+01
2.10000E+00	4.92528E+01	4.92498E+01	0.00000E+00	-5.39168E-01	0.00000E+00	-4.08635E+00	9.00000E+01
2.13333E+00	4.77865E+01	4.77834E+01	0.00000E+00	-5.38467E-01	0.00000E+00	-4.10931E+00	9.00000E+01
2.16667E+00	4.63201E+01	4.63170E+01	0.00000E+00	-5.38136E-01	0.00000E+00	-4.13180E+00	9.00000E+01
2.20000E+00	4.48538E+01	4.48506E+01	0.00000E+00	-5.38091E-01	0.00000E+00	-4.15388E+00	9.00000E+01
2.23333E+00	4.33875E+01	4.33841E+01	0.00000E+00	-5.38236E-01	0.00000E+00	-4.17560E+00	9.00000E+01
2.26667E+00	4.19212E+01	4.19177E+01	0.00000E+00	-5.38472E-01	0.00000E+00	-4.19700E+00	9.00000E+01
2.30000E+00	4.04548E+01	4.04513E+01	0.00000E+00	-5.38702E-01	0.00000E+00	-4.21811E+00	9.00000E+01
2.33333E+00	3.89885E+01	3.89848E+01	0.00000E+00	-5.38830E-01	0.00000E+00	-4.23894E+00	9.00000E+01
2.36667E+00	3.75223E+01	3.75184E+01	0.00000E+00	-5.38768E-01	0.00000E+00	-4.25949E+00	9.00000E+01
2.40000E+00	3.60560E+01	3.60519E+01	0.00000E+00	-5.38433E-01	0.00000E+00	-4.27976E+00	9.00000E+01
2.43333E+00	3.45897E+01	3.45855E+01	0.00000E+00	-5.37763E-01	0.00000E+00	-4.29972E+00	9.00000E+01
2.46667E+00	3.31234E+01	3.31190E+01	0.00000E+00	-5.36705E-01	0.00000E+00	-4.31935E+00	9.00000E+01
2.50000E+00	3.16571E+01	3.16526E+01	0.00000E+00	-5.35228E-01	0.00000E+00	-4.33862E+00	9.00000E+01
2.53333E+00	3.01909E+01	3.01861E+01	0.00000E+00	-5.33315E-01	0.00000E+00	-4.35748E+00	9.00000E+01

2.56667E+00	2.87246E+01	2.87197E+01	0.00000E+00	-5.30970E-01	0.00000E+00	-4.37589E+00	9.00000E+01
2.60000E+00	2.72583E+01	2.72532E+01	0.00000E+00	-5.28225E-01	0.00000E+00	-4.39380E+00	9.00000E+01
2.63333E+00	2.57921E+01	2.57868E+01	0.00000E+00	-5.25103E-01	0.00000E+00	-4.41118E+00	9.00000E+01
2.66667E+00	2.43259E+01	2.43203E+01	0.00000E+00	-5.21663E-01	0.00000E+00	-4.42798E+00	9.00000E+01
2.70000E+00	2.28597E+01	2.28538E+01	0.00000E+00	-5.17973E-01	0.00000E+00	-4.44419E+00	9.00000E+01
2.73333E+00	2.13935E+01	2.13873E+01	0.00000E+00	-5.14112E-01	0.00000E+00	-4.45975E+00	9.00000E+01
2.76667E+00	1.99273E+01	1.99208E+01	0.00000E+00	-5.10167E-01	0.00000E+00	-4.47468E+00	9.00000E+01
2.80000E+00	1.84613E+01	1.84543E+01	0.00000E+00	-5.06226E-01	0.00000E+00	-4.48894E+00	9.00000E+01
2.83333E+00	1.69952E+01	1.69878E+01	0.00000E+00	-5.02379E-01	0.00000E+00	-4.50255E+00	9.00000E+01
2.86667E+00	1.55293E+01	1.55213E+01	0.00000E+00	-4.98716E-01	0.00000E+00	-4.51553E+00	9.00000E+01
2.90000E+00	1.40635E+01	1.40548E+01	0.00000E+00	-4.95318E-01	0.00000E+00	-4.52788E+00	9.00000E+01
2.93333E+00	1.25979E+01	1.25882E+01	0.00000E+00	-4.92261E-01	0.00000E+00	-4.53965E+00	9.00000E+01
2.96667E+00	1.11325E+01	1.11217E+01	0.00000E+00	-4.89606E-01	0.00000E+00	-4.55087E+00	9.00000E+01
3.00000E+00	9.66745E+00	9.65516E+00	0.00000E+00	-4.87400E-01	0.00000E+00	-4.56159E+00	9.00000E+01
3.03333E+00	8.20300E+00	8.18861E+00	0.00000E+00	-4.85674E-01	0.00000E+00	-4.57187E+00	9.00000E+01
3.06667E+00	6.73950E+00	6.72206E+00	0.00000E+00	-4.84444E-01	0.00000E+00	-4.58176E+00	9.00000E+01
3.10000E+00	5.27772E+00	5.25551E+00	0.00000E+00	-4.83706E-01	0.00000E+00	-4.59133E+00	9.00000E+01
3.13333E+00	3.82093E+00	3.79047E+00	0.00000E+00	-4.81503E-01	0.00000E+00	-4.60579E+00	9.00000E+01
3.16667E+00	2.39997E+00	2.35952E+00	0.00000E+00	-4.78801E-01	0.00000E+00	-4.71147E+00	9.00000E+01
3.20000E+00	1.01987E+00	9.33406E-01	0.00000E+00	-4.10949E-01	0.00000E+00	-4.74291E+00	9.00000E+01
3.23333E+00	6.43348E-01	-4.97856E-01	0.00000E+00	-4.07475E-01	0.00000E+00	-4.70954E+00	9.00000E+01
3.26667E+00	1.96605E+00	-1.92339E+00	0.00000E+00	-4.07318E-01	0.00000E+00	-4.68547E+00	9.00000E+01
3.30000E+00	3.36375E+00	-3.33910E+00	0.00000E+00	-4.06431E-01	0.00000E+00	-4.70097E+00	9.00000E+01
3.33333E+00	4.64646E+00	-4.63487E+00	0.00000E+00	-3.27978E-01	0.00000E+00	-6.03910E+00	9.00000E+01
3.36667E+00	5.62917E+00	-5.62917E+00	0.00000E+00	-3.37369E-04	0.00000E+00	-1.12162E+01	9.00000E+01
3.40000E+00	6.42969E+00	-6.40984E+00	0.00000E+00	5.04812E-01	0.00000E+00	-1.89897E+01	9.00000E+01
3.43333E+00	7.22360E+00	-7.16325E+00	0.00000E+00	9.31741E-01	0.00000E+00	-2.56629E+01	9.00000E+01
3.46667E+00	8.05489E+00	-7.95958E+00	0.00000E+00	1.23540E+00	0.00000E+00	-3.04751E+01	9.00000E+01
3.50000E+00	8.15845E+00	-8.79935E+00	0.00000E+00	1.45320E+00	0.00000E+00	-3.39278E+01	9.00000E+01
3.53333E+00	9.81085E+00	-9.67791E+00	0.00000E+00	1.60965E+00	0.00000E+00	-3.63619E+01	9.00000E+01
3.56667E+00	1.07334E+01	-1.05934E+01	0.00000E+00	1.72801E+00	0.00000E+00	-3.78797E+01	9.00000E+01
3.60000E+00	1.16886E+01	-1.15443E+01	0.00000E+00	1.83076E+00	0.00000E+00	-3.85228E+01	9.00000E+01
3.63333E+00	1.26774E+01	-1.25295E+01	0.00000E+00	1.93097E+00	0.00000E+00	-3.83880E+01	9.00000E+01
3.66667E+00	1.36856E+01	-1.35370E+01	0.00000E+00	2.01152E+00	0.00000E+00	-3.78771E+01	9.00000E+01
3.70000E+00	1.46962E+01	-1.45520E+01	0.00000E+00	2.05365E+00	0.00000E+00	-3.72916E+01	9.00000E+01
3.73333E+00	1.57060E+01	-1.55710E+01	0.00000E+00	2.05492E+00	0.00000E+00	-3.66581E+01	9.00000E+01
3.76667E+00	1.67158E+01	-1.65934E+01	0.00000E+00	2.01860E+00	0.00000E+00	-3.59659E+01	9.00000E+01
3.80000E+00	1.77255E+01	-1.76181E+01	0.00000E+00	1.94809E+00	0.00000E+00	-3.52284E+01	9.00000E+01
3.83333E+00	1.87339E+01	-1.86427E+01	0.00000E+00	1.84622E+00	0.00000E+00	-3.44785E+01	9.00000E+01
3.86667E+00	1.97357E+01	-1.96609E+01	0.00000E+00	1.71684E+00	0.00000E+00	-3.38717E+01	9.00000E+01
3.90000E+00	2.07414E+01	-2.06820E+01	0.00000E+00	1.56838E+00	0.00000E+00	-3.34803E+01	9.00000E+01
3.93333E+00	2.17578E+01	-2.17124E+01	0.00000E+00	1.40381E+00	0.00000E+00	-3.31383E+01	9.00000E+01
3.96667E+00	2.27836E+01	-2.27510E+01	0.00000E+00	1.21866E+00	0.00000E+00	-3.27476E+01	9.00000E+01
4.00000E+00	2.38176E+01	-2.37962E+01	0.00000E+00	1.00914E+00	0.00000E+00	-3.23045E+01	9.00000E+01
4.03333E+00	2.48602E+01	-2.48476E+01	0.00000E+00	7.92679E-01	0.00000E+00	-3.18137E+01	9.00000E+01
4.06667E+00	2.59111E+01	-2.59044E+01	0.00000E+00	5.88646E-01	0.00000E+00	-3.12828E+01	9.00000E+01
4.10000E+00	2.69691E+01	-2.69661E+01	0.00000E+00	4.00666E-01	0.00000E+00	-3.07180E+01	9.00000E+01
4.13333E+00	2.80329E+01	-2.80320E+01	0.00000E+00	2.28589E-01	0.00000E+00	-3.01251E+01	9.00000E+01
4.16667E+00	2.91018E+01	-2.91017E+01	0.00000E+00	7.19025E-02	0.00000E+00	-2.95104E+01	9.00000E+01
4.20000E+00	3.01748E+01	-3.01747E+01	0.00000E+00	-6.96003E-02	0.00000E+00	-2.88785E+01	9.00000E+01
4.23333E+00	3.12514E+01	-3.12508E+01	0.00000E+00	-1.96040E-01	0.00000E+00	-2.82344E+01	9.00000E+01
4.26667E+00	3.23310E+01	-3.23295E+01	0.00000E+00	-3.07494E-01	0.00000E+00	-2.75827E+01	9.00000E+01
4.30000E+00	3.34130E+01	-3.34106E+01	0.00000E+00	-4.04070E-01	0.00000E+00	-2.69281E+01	9.00000E+01
4.33333E+00	3.44972E+01	-3.44938E+01	0.00000E+00	-4.85972E-01	0.00000E+00	-2.62745E+01	9.00000E+01

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Thu Oct 31 12:22:24 1991

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4.36667E+00	3.55831E+01	-3.55788E+01	0.00000E+00	-5.53564E-01	0.00000E+00	-2.56258E+01	9.00000E+01
4.40000E+00	3.66706E+01	-3.66656E+01	0.00000E+00	-6.07234E-01	0.00000E+00	-2.49842E+01	9.00000E+01
4.43333E+00	3.77594E+01	-3.77538E+01	0.00000E+00	-6.47759E-01	0.00000E+00	-2.43532E+01	9.00000E+01
4.46667E+00	3.88493E+01	-3.88434E+01	0.00000E+00	-6.76148E-01	0.00000E+00	-2.37353E+01	9.00000E+01
4.50000E+00	3.99402E+01	-3.99341E+01	0.00000E+00	-6.93585E-01	0.00000E+00	-2.31320E+01	9.00000E+01
4.53333E+00	4.10319E+01	-4.10259E+01	0.00000E+00	-7.01371E-01	0.00000E+00	-2.25444E+01	9.00000E+01
4.56667E+00	4.21246E+01	-4.21187E+01	0.00000E+00	-7.00870E-01	0.00000E+00	-2.19731E+01	9.00000E+01
4.60000E+00	4.32180E+01	-4.32125E+01	0.00000E+00	-6.93449E-01	0.00000E+00	-2.14184E+01	9.00000E+01
4.63333E+00	4.43123E+01	-4.43071E+01	0.00000E+00	-6.80444E-01	0.00000E+00	-2.08805E+01	9.00000E+01
4.66667E+00	4.54073E+01	-4.54025E+01	0.00000E+00	-6.63127E-01	0.00000E+00	-2.03591E+01	9.00000E+01
4.70000E+00	4.65031E+01	-4.64987E+01	0.00000E+00	-6.42673E-01	0.00000E+00	-1.98540E+01	9.00000E+01
4.73333E+00	4.75997E+01	-4.75956E+01	0.00000E+00	-6.20136E-01	0.00000E+00	-1.93648E+01	9.00000E+01
4.76667E+00	4.86970E+01	-4.86933E+01	0.00000E+00	-5.96436E-01	0.00000E+00	-1.88911E+01	9.00000E+01
4.80000E+00	4.97950E+01	-4.97917E+01	0.00000E+00	-5.72355E-01	0.00000E+00	-1.84325E+01	9.00000E+01
4.83333E+00	5.08937E+01	-5.08907E+01	0.00000E+00	-5.48707E-01	0.00000E+00	-1.79885E+01	9.00000E+01
4.86667E+00	5.19931E+01	-5.19904E+01	0.00000E+00	-5.25575E-01	0.00000E+00	-1.75589E+01	9.00000E+01
4.90000E+00	5.30931E+01	-5.30907E+01	0.00000E+00	-5.03754E-01	0.00000E+00	-1.71432E+01	9.00000E+01
4.93333E+00	5.41938E+01	-5.41917E+01	0.00000E+00	-4.83402E-01	0.00000E+00	-1.67410E+01	9.00000E+01
4.96667E+00	5.52952E+01	-5.52932E+01	0.00000E+00	-4.64716E-01	0.00000E+00	-1.63519E+01	9.00000E+01
5.00000E+00	5.63971E+01	-5.63953E+01	0.00000E+00	-4.47807E-01	0.00000E+00	-1.59756E+01	9.00000E+01
5.03333E+00	5.74996E+01	-5.74980E+01	0.00000E+00	-4.32718E-01	0.00000E+00	-1.56116E+01	9.00000E+01
5.06667E+00	5.86028E+01	-5.86013E+01	0.00000E+00	-4.19434E-01	0.00000E+00	-1.52598E+01	9.00000E+01
5.10000E+00	5.97064E+01	-5.97050E+01	0.00000E+00	-4.07896E-01	0.00000E+00	-1.49196E+01	9.00000E+01
5.13333E+00	6.08106E+01	-6.08093E+01	0.00000E+00	-3.98012E-01	0.00000E+00	-1.45907E+01	9.00000E+01
5.16667E+00	6.19154E+01	-6.19141E+01	0.00000E+00	-3.89665E-01	0.00000E+00	-1.42729E+01	9.00000E+01
5.20000E+00	6.30206E+01	-6.30194E+01	0.00000E+00	-3.82721E-01	0.00000E+00	-1.39657E+01	9.00000E+01
5.23333E+00	6.41263E+01	-6.41252E+01	0.00000E+00	-3.77036E-01	0.00000E+00	-1.36889E+01	9.00000E+01
5.26667E+00	6.52326E+01	-6.52315E+01	0.00000E+00	-3.72464E-01	0.00000E+00	-1.33822E+01	9.00000E+01
5.30000E+00	6.63393E+01	-6.63383E+01	0.00000E+00	-3.68860E-01	0.00000E+00	-1.31051E+01	9.00000E+01
5.33333E+00	6.74465E+01	-6.74455E+01	0.00000E+00	-3.66084E-01	0.00000E+00	-1.28375E+01	9.00000E+01
5.36667E+00	6.85541E+01	-6.85532E+01	0.00000E+00	-3.64005E-01	0.00000E+00	-1.25790E+01	9.00000E+01
5.40000E+00	6.96622E+01	-6.96613E+01	0.00000E+00	-3.62499E-01	0.00000E+00	-1.23294E+01	9.00000E+01
5.43333E+00	7.07708E+01	-7.07698E+01	0.00000E+00	-3.61459E-01	0.00000E+00	-1.20883E+01	9.00000E+01
5.46667E+00	7.18797E+01	-7.18788E+01	0.00000E+00	-3.60785E-01	0.00000E+00	-1.18555E+01	9.00000E+01
5.50000E+00	7.29891E+01	-7.29882E+01	0.00000E+00	-3.60392E-01	0.00000E+00	-1.16308E+01	9.00000E+01
5.53333E+00	7.40989E+01	-7.40980E+01	0.00000E+00	-3.60208E-01	0.00000E+00	-1.14138E+01	9.00000E+01
5.56667E+00	7.52091E+01	-7.52083E+01	0.00000E+00	-3.60172E-01	0.00000E+00	-1.12043E+01	9.00000E+01
5.60000E+00	7.63197E+01	-7.63189E+01	0.00000E+00	-3.60232E-01	0.00000E+00	-1.10020E+01	9.00000E+01
5.63333E+00	7.74307E+01	-7.74299E+01	0.00000E+00	-3.60351E-01	0.00000E+00	-1.08068E+01	9.00000E+01
5.66667E+00	7.85421E+01	-7.85413E+01	0.00000E+00	-3.60498E-01	0.00000E+00	-1.06183E+01	9.00000E+01
5.70000E+00	7.96539E+01	-7.96531E+01	0.00000E+00	-3.60653E-01	0.00000E+00	-1.04363E+01	9.00000E+01
5.73333E+00	8.07661E+01	-8.07653E+01	0.00000E+00	-3.60800E-01	0.00000E+00	-1.02606E+01	9.00000E+01
5.76667E+00	8.18786E+01	-8.18778E+01	0.00000E+00	-3.60932E-01	0.00000E+00	-1.00910E+01	9.00000E+01
5.80000E+00	8.29915E+01	-8.29907E+01	0.00000E+00	-3.61043E-01	0.00000E+00	-9.92719E+00	9.00000E+01
5.83333E+00	8.41047E+01	-8.41039E+01	0.00000E+00	-3.61135E-01	0.00000E+00	-9.76904E+00	9.00000E+01
5.86667E+00	8.52183E+01	-8.52175E+01	0.00000E+00	-3.61211E-01	0.00000E+00	-9.61633E+00	9.00000E+01
5.90000E+00	8.63322E+01	-8.63315E+01	0.00000E+00	-3.61276E-01	0.00000E+00	-9.46884E+00	9.00000E+01
5.93333E+00	8.74465E+01	-8.74457E+01	0.00000E+00	-3.61338E-01	0.00000E+00	-9.32640E+00	9.00000E+01
5.96667E+00	8.85611E+01	-8.85604E+01	0.00000E+00	-3.61402E-01	0.00000E+00	-9.18881E+00	9.00000E+01
6.00000E+00	8.96760E+01	-8.96753E+01	0.00000E+00	-3.61479E-01	0.00000E+00	-9.05590E+00	9.00000E+01

1Boat 30 mph

Request Number

32064

Force exerted on Marker 2006 by Marker 3200

Time	Fm	Fx	Fy	Fz	Tqm	Tqx	Tqy	Tqz
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[illegible]

[illegible]



[illegible]

[illegible]

# **APPENDIX F**

## **Boat Performance Calculations and Data**



# Nomenclature

$C_f$ = friction-drag coefficient = $D_f \cos \frac{\beta}{2} V^2 \lambda b^3$	$g$ = acceleration due to gravity, = 32.2 ft/sec <sup>2</sup>	$f$ = distance between $T$ and CG (measured normal to $T$ ), ft
$C_{L_0}$ = lift coefficient, zero deadrise, = $\Delta / 2 V^2 b^3$	$L_c$ = wetted chine length, ft	$T$ = propeller thrust, lb
$C_{L_\beta}$ = lift coefficient, deadrise surface, = $\Delta / 2 V^2 b^3$	$L_k$ = wetted keel length, ft	$\epsilon$ = inclination of thrust line relative to keel line, deg
$C_{L_d}$ = dynamic component of lift coefficient	$l_p$ = distance from transom to point of intersection of hydrodynamic-force vector with keel (measured along keel), ft	$c$ = distance between $N$ and CG (measured normal to $N$ ), ft
$C_{L_b}$ = buoyant component of lift coefficient	$V$ = horizontal velocity of planing surface, fps	$L_1$ = difference between wetted keel and chine lengths, ft = $(L_k - L_c)$
$C_p$ = distance of center of pressure (hydrodynamic force) measured along keel forward of transom = $l_p / \lambda b$	$V_1$ = mean velocity over bottom of planing surface, $f(r, \lambda)$ , fps	$L_2$ = difference between keel and chine lengths wetted by level water surface, ft
$C_s$ = speed coefficient = $V / (g b)^{1/2}$	$\beta$ = angle of deadrise of planing surface, deg	$L_m$ = mean wetted length, ft = $(L_k + L_c) / 2$
$R_e$ = Reynolds number, = $V_1 \lambda b / \nu$	$\Delta$ = load on water, lb	$w$ = specific weight of water, pcf
$\lambda$ = mean wetted length-beam ratio = $\frac{(L_k + L_c)}{2b}$	$\nu$ = kinematic viscosity of fluid, ft <sup>2</sup> /sec	$\gamma$ = angle between spray root line and keel line measured in plane parallel to keel, deg
$\lambda_1$ = mean wetted length-beam ratio based on area below undisturbed water surface	$\rho$ = mass density of water, $w/g$	$\tau$ = trim angle of planing area, deg
where	$L_d$ = hydrostatic lift component, lb	LCG = longitudinal distance of center of gravity from transom (measured along keel), ft
$b$ = beam of planing surface, ft	$D$ = total horizontal hydrodynamic drag component, lb	$\phi$ = angle between the keel and spray edge measured in plane of bottom, deg
$D_f$ = frictional drag-force component along bottom surface, lb, = $D \cos \tau = \Delta \sin \tau$	$D_p$ = resistance component due to pressure force, lb	$A_s$ = total wetted spray area, sq ft
	$d$ = vertical depth of trailing edge of boat (at keel) below level water surface, ft	VCG = distance of center of gravity above keel line, measured normal to keel, ft
	$N$ = component of resistance force normal to bottom, lb	
	$a$ = distance between $D_f$ and CG (measured normal to $D_f$ ), ft	



	A	B	C	D	E	F
1	<b>Planing Boat Speed Estimator</b>					
2						
3	required input data:			calculated values:		
4						
5	weight of boat (lbs):		4732.3		d (ft):	0.500
6	deadrise angle (deg):		9.658		lambda:	1.673
7	planing angle (deg):		5		Re:	3.9398E+07
8	horsepower:		90		Cf:	2.3955E-03
9	planing beam (ft):		5.876		Df:	328.421
10	estimated speed (mph):		33.5		D (lbs):	743.668
11					EHP:	45.296
12					OPC:	0.503
13						
14					C(L0):	

9 JULY 1991 <sup>AK</sup>  
①

TO FIND VALUES

① TRIM ANGLE VS SPEED - SEE GRAPH  $\tau$  VS  $V$

② ROLL STIFFNESS AT ZERO SPEED - SEE RIGHTING ARM CURVE. RECOMMEND USING  $VCG = 2'$  (CASE 3)

③ FOR BASIC HULL PROPERTIES SEE HYDROSTATICS TABLES AT CORRECT TRIM ANGLE FOR CORRESPONDING SPEED.

④ FOR RISE IN CG CALCULATE  $\Delta_{\text{DYNAMIC}}$  AND INTERPOLATE FROM HYDRO AT CORRECT TRIM.

FIND:  $C_v = V / (g b)^{1/2}$

$$C_{L_0} = \tau^{1.1} (0.0120 \lambda^2 + 0.0055 \lambda^2 / C_v^2)$$

$$C_{L_p} = C_{L_0} - 0.0065 \beta C_{L_0}^{0.60}$$

$$\Delta_D = \frac{1}{2} \rho V^2 b^2 C_{L_p}$$

⑤ TO FIND CENTER OF PRESSURE FORWARD OF TRANSM) USE

$$\text{FIND: } C_p = \left[ 0.75 - 1 / (5.21 C_v^2 / \lambda^2 + 2.39) \right]$$

$$\text{CENTER} = C_p b \lambda$$

$\lambda$  WILL CHANGE WITH TRIM CHANGE AT COLLISION DUE TO CHANGING WATERLINE LENGTH. THE CENTER CALCULATED AT THE STEADY STATE CONDITIONS PRIOR TO THE COLLISION CAN BE USED AS THE LCG FOR PURPOSES OF ESTIMATING PITCH TRIM MOMENTS.

See next page for correction



This sheet  
corrects a formula  
on page 2 29 Aug 91

THERE WAS AN ERROR IN THE FORMULA FOR  
DYNAMIC SUPPORTED WEIGHT,  $\Delta_D$ , GIVEN IN THE  
9 JULY SHEET. THE TERM  $C_L$  WAS INADVERTENTLY  
LEFT OUT.

THE FORMULA FOR  $\Delta_D$  SHOULD READ:

$$\Delta_D = \frac{1}{2} \rho V^2 b^2 C_L C_{Lp}$$

WHICH FOR OUR CASE IS:

$$b = 5.876' \quad b^2 = 34.527$$

$$\alpha = 5^\circ$$

$$V = 33.5 \text{ mph} = 49.13 \text{ ft/s}$$

$$\rho = 1.9384 \quad \frac{1}{2} \rho = 0.969$$

$$\beta = 9.658^\circ$$

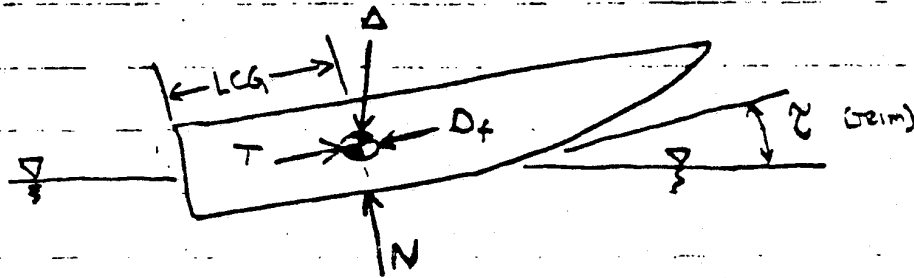
$$C_L = 0.10$$

$$C_{Lp} = C_L - 0.0065 \beta C_L^{0.60} = 0.084$$

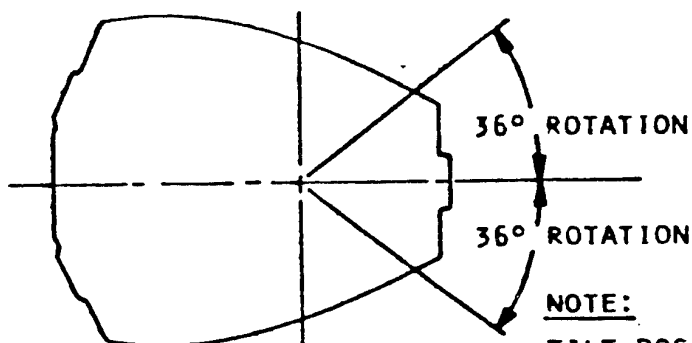
$$\Delta_D = \frac{1}{2} \rho V^2 b^2 C_L C_{Lp} = (0.969)(49.13)^2 (5.876)^2 (0.10)(0.084) \\ = 678.36 \text{ lb}$$

9 JULY 1991

⑥ NOTE THAT ALL FORCES ACT THROUGH THE CENTER OF GRAVITY



IN THIS CASE  $LCG = Cpb\lambda$  AT EQUILIBRIUM



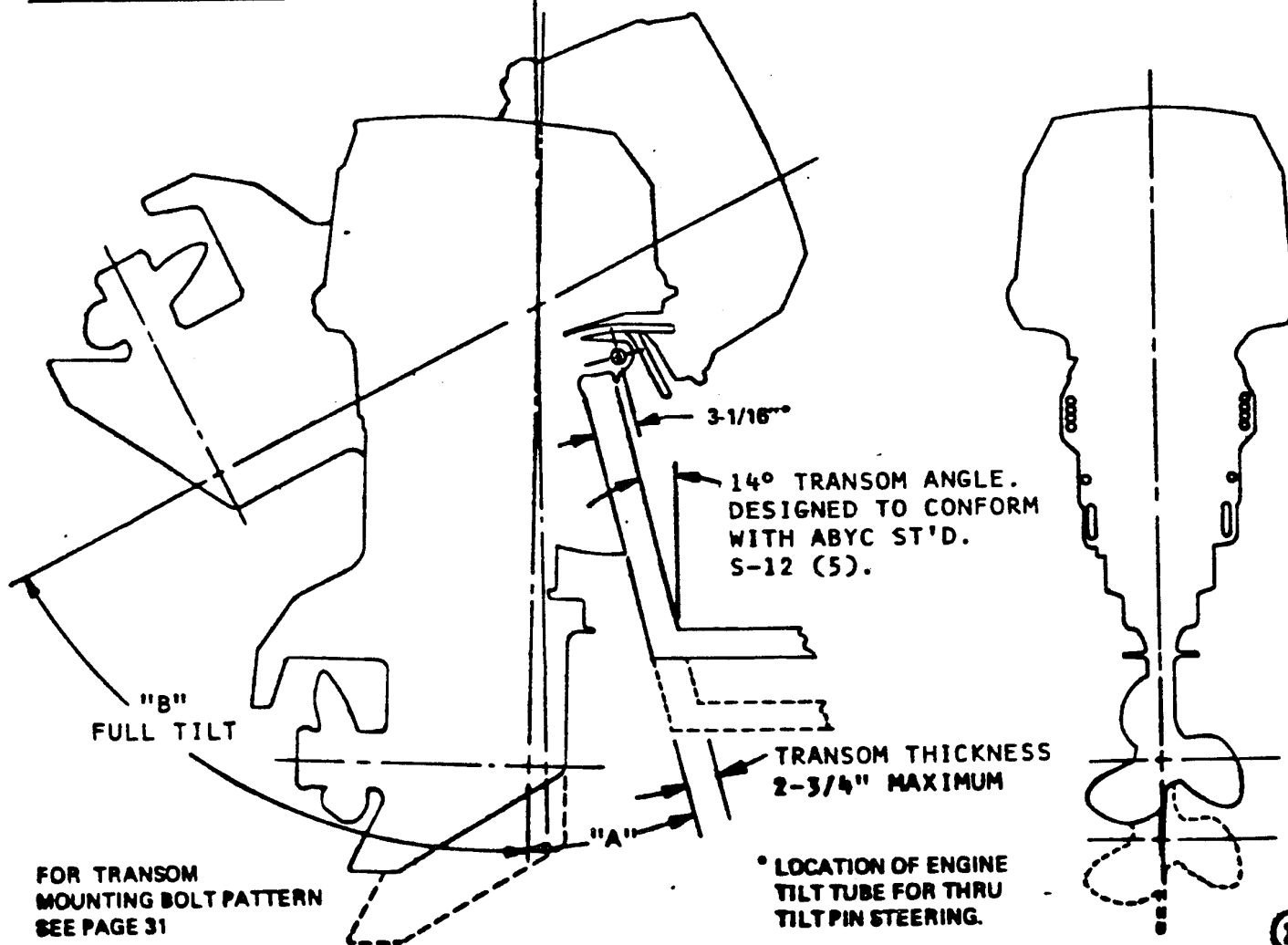
**NOTE:**

TILT POSITION IN FIGURE IS BASED ON A 14° TRANSOM AND SECOND TILT ANGLE ADJUSTING ROD POSITION. CHART SHOWS TILT ANGLE ADJUSTING ROD POSITION FOR A NEAR VERTICAL MOTOR CENTERLINE WITH TRANSOM ANGLE "A" AND FULL TILT MOTOR ANGLE "B" FROM EACH ANGLE ADJUSTING ROD POSITION.

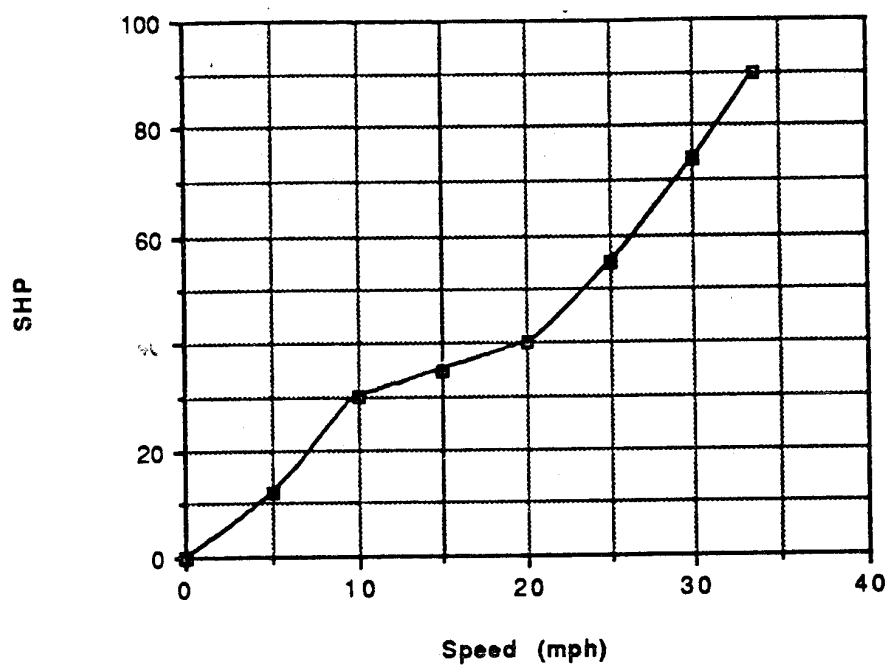
**ANGLE ADJUSTING ROD**

"A"	POSITION	"B"
12°	1ST	65°
16°	2ND	61°
20°	3RD	57°
24°	4TH	53°
27°	5TH	50°

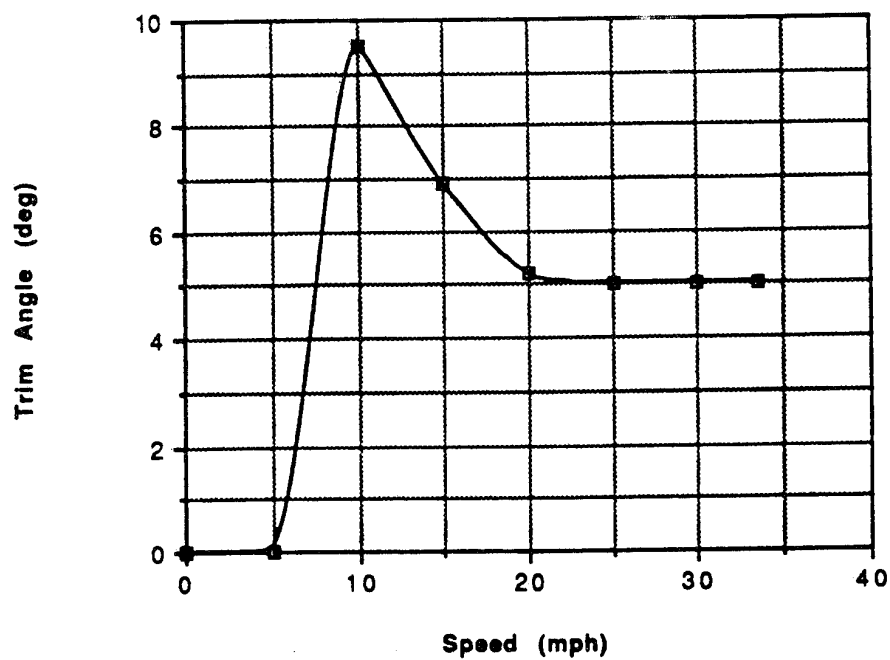
STEERING PIVOT



**SHP vs Speed estimate for 18' UL speedboat**



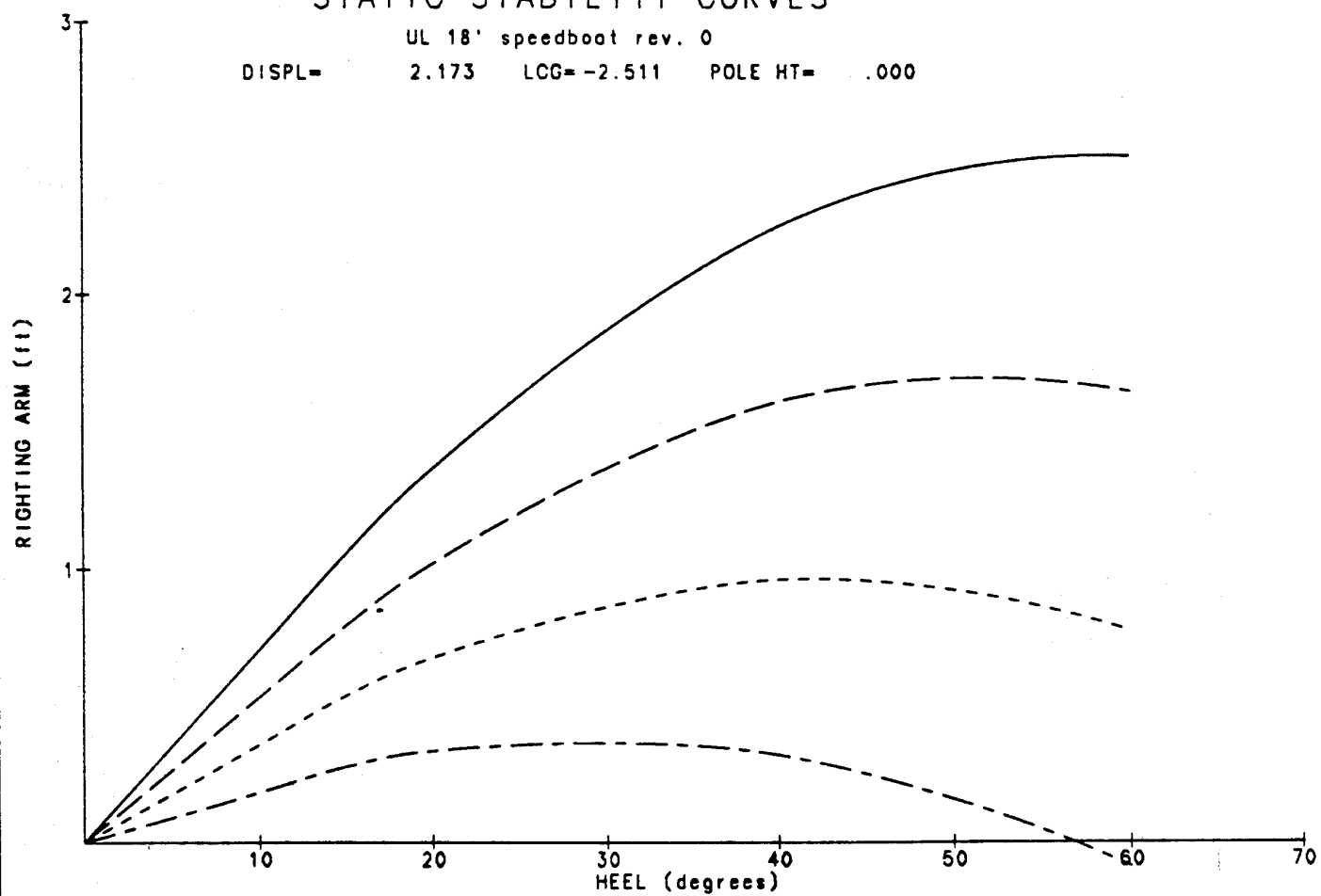
**Trim Angle vs Speed estimate for UL 18' speedboat**



# STATIC STABILITY CURVES

UL 18' speedboat rev. 0

DISPL= 2.173 LCG=-2.511 POLE HT= .000



Case 1  $v_{cg}=0.0'$   
Case 4  $v_{cg}=3.0'$

Case 2  $v_{cg}=1.0'$

Case 3  $v_{cg}=2.0'$

THE UNIVERSITY OF MICHIGAN  
DEPARTMENT OF NAVAL ARCHITECTURE AND MARINE ENGINEERING  
INTACT STABILITY PROGRAM - INTAC-1.1  
ADAPTED FROM THE SHIP HULL CHARACTERISTICS PROGRAM - SHCP

SHIP IDENTIFIER- 18' speed boat rev. 0

SHIP NO.- 91

COND/RUN IDENTIFIER- UL 18' speedboat rev.- 0

DATE- 07/05/91

DESIGN DISPLACEMENT	2.173 TONS SW
DESIGN LCG	-2.511 FEET FROM AMIDSHIPS (+ FWD)
DESIGN DRAFT	1.250 FEET
DESIGN TRIM	.000 FEET (+ BY STERN)
LENGTH OVERALL	18.000 FEET
LENGTH BETWEEN PERPENDICULARS	18.000 FEET
LENGTH ON DESIGN WATERLINE	16.022 FEET
STATION OF MAX AREA - AT DWL	11.000 FEET FROM FP
BEAM AT STATION OF MAX AREA	6.187 FEET
SECTION AREA COEFFICIENT	.7755
PRISMATIC COEFFICIENT	.7043
BLOCK COEFFICIENT	.5462

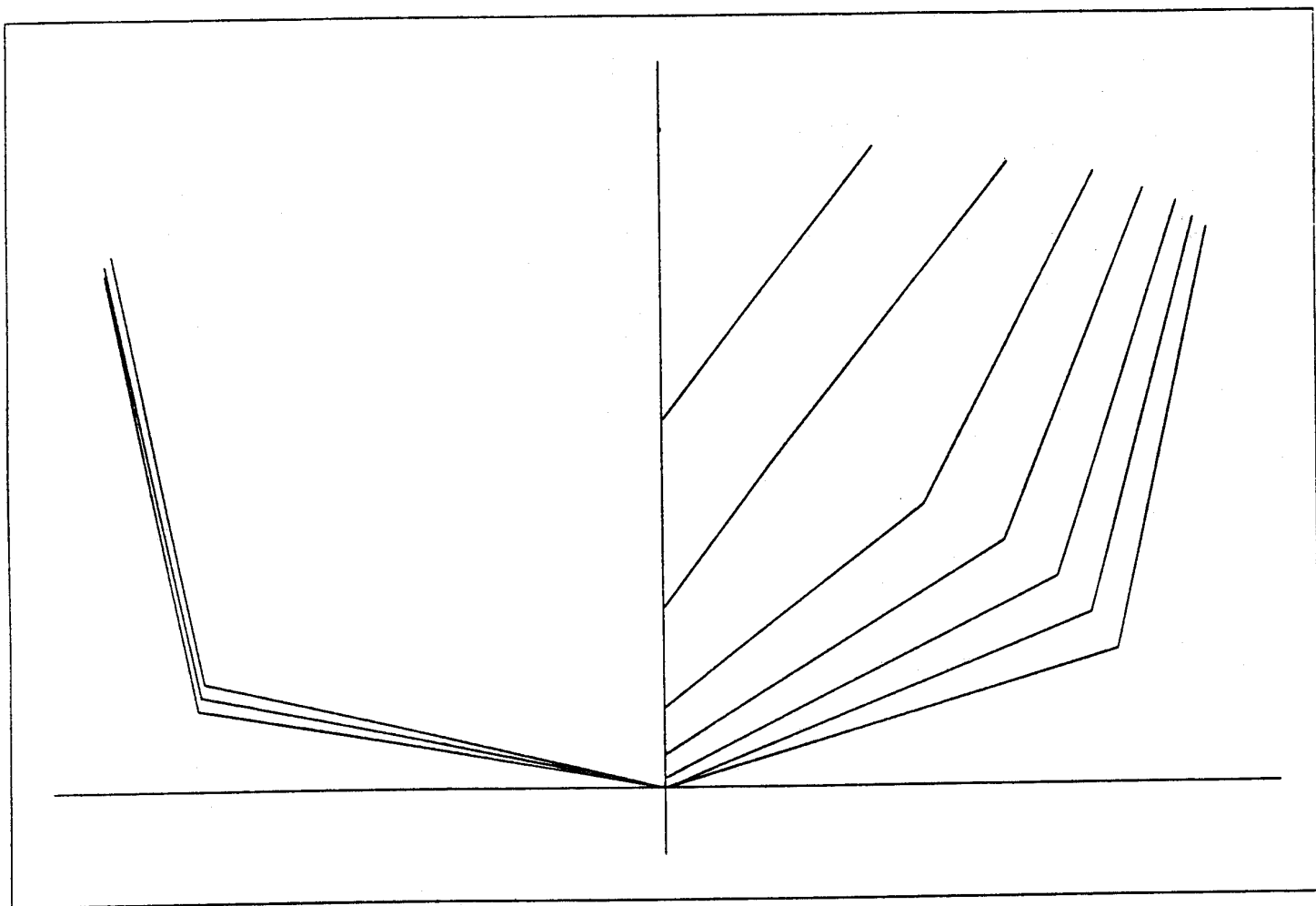
4 INPUT DISPLS	2.173	2.173	2.173	2.173	
4 INPUT LCGS	-2.511	-2.511	-2.511	-2.511	
1 INPUT POLES	.000				
9 INPUT HEELS	.000	5.000	10.000	15.000	20.000
	30.000	40.000	50.000	60.000	

DEFINITIONS

DISPL	DISPLACEMENT IN TONS SW
LCG	LCG IN FEET FROM AMIDSHIPS (+ FWD)
HEEL	INPUT HEEL ANGLE IN DEGREES
TCB	TRANSVERSE CENTER OF BUOYANCY FROM CL IN FEET
VCB	VERTICAL CENTER OF BUOYANCY ABOVE BL IN FEET
RA	RIGHTING ARM IN FEET
DRAFT	DRAFT AMIDSHIPS IN FEET
TRIM	TOTAL TRIM IN FEET (+ BY STERN)

# INTACT CURVES OF STATICAL STABILITY

DISPL	LCG	POLE HT	HEEL	RA	TCE	VCB	DRAFT	TRIM
2.173	-2.511	.00	.000	.000	.000	.766	1.250	.000
			5.000	.352	.285	.778	1.246	.007
			10.000	.704	.571	.816	1.233	.027
			15.000	1.054	.855	.879	1.208	.064
			20.000	1.361	1.100	.956	1.160	.095
			30.000	1.863	1.494	1.138	.978	.111
			40.000	2.248	1.800	1.351	.676	.104
			50.000	2.455	1.988	1.537	.226	.302
			60.000	2.508	2.094	1.687	-.453	.617
2.173	-2.511	1.00	.000	.000	.000	.766	1.250	.000
			5.000	.265	.285	.778	1.246	.007
			10.000	.531	.571	.816	1.233	.027
			15.000	.795	.855	.879	1.208	.064
			20.000	1.019	1.100	.956	1.160	.095
			30.000	1.363	1.494	1.138	.978	.111
			40.000	1.605	1.800	1.351	.676	.104
			50.000	1.689	1.988	1.537	.226	.302
			60.000	1.642	2.094	1.687	-.453	.617
2.173	-2.511	2.00	.000	.000	.000	.766	1.250	.000
			5.000	.177	.285	.778	1.246	.007
			10.000	.357	.571	.816	1.233	.027
			15.000	.536	.855	.879	1.208	.064
			20.000	.677	1.100	.956	1.160	.095
			30.000	.863	1.494	1.138	.978	.111
			40.000	.962	1.800	1.351	.676	.104
			50.000	.923	1.988	1.537	.226	.302
			60.000	.776	2.094	1.687	-.453	.617
2.173	-2.511	3.00	.000	.000	.000	.766	1.250	.000
			5.000	.090	.285	.778	1.246	.007
			10.000	.183	.571	.816	1.233	.027
			15.000	.277	.855	.879	1.208	.064
			20.000	.335	1.100	.956	1.160	.095
			30.000	.363	1.494	1.138	.978	.111
			40.000	.319	1.800	1.351	.676	.104
			50.000	.157	1.988	1.537	.226	.302
			60.000	-.090	2.094	1.687	-.453	.617





## HYDROSTATICS - PART I TRIM .000 FEET

	DRAFT	VOLUME	DISPLACEMENT	LCB	KB	WETTED SURFACE	PRISMATIC COEF	WPLANE COEF	WPLANE I COEF
	.50	17.	.5	-3.11	.33	70.	.636	.642	.0453
	1.00	55.	1.6	-2.69	.63	93.	.684	.750	.0561
DWL	1.25	76.	2.2	-2.51	.77	103.	.704	.776	.0582
	1.50	98.	2.8	-2.36	.90	112.	.721	.793	.0594
	2.00	144.	4.1	-2.14	1.18	130.	.746	.815	.0607
	2.50	193.	5.5	-1.97	1.45	148.	.764	.837	.0619
	3.00	245.	7.0	-1.83	1.72	167.	.779	.860	.0635
	3.50	279.	8.0	-1.54	1.90	180.	.819	.264	.0144

## HYDROSTATICS - PART II TRIM .000 FEET

	DRAFT	WPLANE AREA	LCF	TPI	CIDOFTS	LONG. BM	TRNSV BM	LONG. KM	TRNSV KM	MT1
	.50	68.	-3.03	.16	.33	53.3	9.80	53.6	10.13	.1
	1.00	82.	-2.15	.20	.28	24.5	4.13	25.2	4.76	.2
DWL	1.25	86.	-1.92	.21	.26	19.8	3.27	20.6	4.03	.2
	1.50	90.	-1.77	.21	.25	16.6	2.71	17.6	3.62	.2
	2.00	95.	-1.56	.23	.24	12.8	2.08	13.9	3.25	.2
	2.50	101.	-1.35	.24	.22	10.7	1.74	12.2	3.19	.3
	3.00	107.	-1.12	.25	.19	9.6	1.54	11.3	3.26	.3
	3.50	33.	5.04	.08	-.27	.4	.32	2.3	2.22	0.0

## SECTIONAL AREAS IN SQUARE FEET - PART 1 TRIM .000 FEET

	STATION	.000	1.000	2.000	3.000	4.000	5.000	6.000	7.000
	DRAFT								
	.50	.00	.00	.00	.00	.14	.39	.63	.86
	1.00	.00	.00	.00	.33	1.03	1.77	2.52	3.32
DWL	1.25	.00	.00	.01	.74	1.77	2.83	3.85	4.77
	1.50	.00	.00	.11	1.31	2.71	4.07	5.23	6.25
	2.00	.00	.00	.60	2.89	4.93	6.68	8.08	9.28
	2.50	.00	.04	1.47	4.78	7.36	9.45	11.07	12.43
	3.00	.00	.41	2.75	6.93	9.99	12.39	14.19	15.69
	3.50	.00	1.17	4.41	9.34	12.82	15.50	17.45	18.77

## SECTIONAL AREAS IN SQUARE FEET - PART 2 TRIM .000 FEET

	STATION	8.000	9.000	10.000	11.000	12.000	13.000	14.000	15.000
	DRAFT								
	.50	1.09	1.26	1.47	1.47	1.47	1.47	1.47	1.47
	1.00	3.89	4.18	4.46	4.46	4.46	4.46	4.46	4.46
DWL	1.25	5.39	5.69	6.00	6.00	6.00	6.00	6.00	6.00
	1.50	6.91	7.24	7.56	7.56	7.56	7.56	7.56	7.56
	2.00	10.03	10.41	10.75	10.75	10.75	10.75	10.75	10.75
	2.50	13.26	13.69	14.06	14.06	14.06	14.06	14.06	14.06
	3.00	16.60	17.07	17.46	17.46	17.46	17.46	17.46	17.46
	3.50	18.88	18.96	18.91	18.91	18.91	18.91	18.91	18.91

SECTIONAL AREAS IN SQUARE FEET - PART 3      TRIM      .000 FEET

STATION	16.000	17.000	18.000
DRAFT			
.50	1.47	1.47	1.47
1.00	4.46	4.46	4.46
DWT. 1.25	6.00	6.00	6.00
1.50	7.56	7.56	7.56
2.00	10.75	10.75	10.75
2.50	14.06	14.06	14.06
3.00	17.46	17.46	17.46
3.50	18.91	18.91	18.91

THE UNIVERSITY OF MICHIGAN  
DEPARTMENT OF NAVAL ARCHITECTURE AND MARINE ENGINEERING  
HYDROSTATICS PROPERTIES PROGRAM - HYDRO-1.1  
ADAPTED FROM THE SHIP HULL CHARACTERISTICS PROGRAM - SHCP

SHIP IDENTIFIER- 18' speed boat rev. 0

SHIP NO.- 91

COND/RUN IDENTIFIER- UL 18' speedboat trimmed hydro

DATE-07/13/91

DESIGN DISPLACEMENT	2.173 TONS SW
DESIGN LCG	-2.511 FEET FROM AMIDSHIPS (+ FWD)
DESIGN DRAFT	1.250 FEET
DESIGN TRIM	.000 FEET (+ BY STERN)
LENGTH OVERALL	18.000 FEET
LENGTH BETWEEN PERPENDICULARS	18.000 FEET
LENGTH ON DESIGN WATERLINE	16.022 FEET
STATION OF MAX AREA - AT DWL	11.000 FEET FROM FP
BEAM AT STATION OF MAX AREA	6.187 FEET
SECTION AREA COEFFICIENT	.7755
PRISMATIC COEFFICIENT	.7043
BLOCK COEFFICIENT	.5462

WATERLINES IN FEET

.50  
.60  
.70  
.80  
.90  
1.00  
1.10  
1.20  
1.25 DWL

DESIGN WATERLINE INDICATED BY DWL

TRIMS IN FEET (+ BY STERN)

1.506  
1.089  
.803  
.787

# UNITS AND DEFINITIONS

CIDOFTS,	CHANGE IN DISPLACEMENT FOR ONE FOOT TRIM BY STERN IN TONS
DISPLACEMENT	DISPLACEMENT IN LONG TONS
KB	HEIGHT OF CENTER OF BUOYANCY ABOVE BASELINE IN FEET
LCB	LONGITUDINAL CENTER OF BUOYANCY IN FEET FROM AMIDSHIPS (+ FWD)
LCF	LONGITUDINAL CENTER OF FLOTATION IN FEET FROM AMIDSHIPS (+ FWD)
LONG.BM	LONGITUDINAL BM IN FEET
LONG.KM	LONGITUDINAL KM IN FEET
MT1	MOMENT TO CHANGE TRIM ONE INCH IN FOOT TONS
PRISMATIC	PRISMATIC COEFFICIENT - $VOLUME / (LBP \times AREA^*)$
TPI	TONS PER INCH IMMERSION
TRNSV BM	TRANSVERSE BM IN FEET
TRNSV KM	TRANSVERSE KM IN FEET
VOLUME	DISPLACED VOLUME IN CUBIC FEET
WETTED SURFACE	SURFACE AREA OF WETTED PORTION OF HULL IN SQUARE FEET
WPLANE AREA	AREA OF WATERPLANE IN SQUARE FEET
WPLANE COEF	WATERPLANE COEFFICIENT - $WATERPLANE AREA / (LBP \times BEAM^*)$
WPLANE I COEF	INERTIA COEF - $WPLANE TRANSV. INERTIA / (LBP \times BEAM^* CUBED)$

AREA\* AND BEAM\* ARE PROPERTIES AT THE TABULATED DRAFT  
OF THE STATION OF MAXIMUM AREA AT DESIGN DRAFT

## HYDROSTATICS - PART I TRIM 1.506 FEET

DRAFT	VOLUME	DISPLACEMENT	LCB	KB	WETTED SURFACE	PRISMATIC COEF	WPLANE COEF	WPLANE I COEF
.50	35.	1.0	-5.08	.57	71.	.796	.597	.0453
.60	42.	1.2	-4.83	.61	76.	.761	.628	.0484
.70	49.	1.4	-4.61	.66	80.	.741	.650	.0500
.80	56.	1.6	-4.41	.70	85.	.729	.670	.0516
.90	63.	1.8	-4.24	.75	89.	.723	.689	.0530
1.00	71.	2.0	-4.07	.80	94.	.720	.708	.0549
1.10	79.	2.3	-3.93	.84	98.	.720	.720	.0554
1.20	87.	2.5	-3.79	.89	102.	.720	.732	.0561
DWL 1.25	91.	2.6	-3.73	.91	104.	.721	.737	.0565

## HYDROSTATICS - PART II TRIM 1.506 FEET

DRAFT	WPLANE AREA	LCF	TPI	CIDOFIS	LONG. BM	TRNSV BM	LONG. KM	TRNSV KM	MT1
.50	64.	-3.63	.15	.37	19.1	4.86	19.7	5.43	.1
.60	68.	-3.37	.16	.36	18.4	4.46	19.1	5.08	.1
.70	71.	-3.17	.17	.36	17.6	4.04	18.3	4.70	.1
.80	73.	-3.00	.17	.35	16.8	3.71	17.5	4.41	.1
.90	76.	-2.83	.18	.34	16.2	3.43	16.9	4.18	.1
1.00	78.	-2.67	.19	.33	15.7	3.23	16.5	4.03	.1
1.10	80.	-2.55	.19	.32	15.0	3.00	15.8	3.84	.2
1.20	82.	-2.44	.20	.32	14.4	2.81	15.3	3.70	.2
DWL 1.25	83.	-2.38	.20	.31	14.2	2.73	15.1	3.64	.2

## HYDROSTATICS - PART I TRIM 1.089 FEET

DRAFT	VOLUME	DISPLACEMENT	LCB	KB	WETTED SURFACE	PRISMATIC COEF	WPLANE COEF	WPLANE I COEF
.50	30.	.9	-4.81	.50	70.	.761	.607	.0451
.60	37.	1.0	-4.55	.55	76.	.732	.640	.0485
.70	44.	1.2	-4.32	.59	80.	.718	.663	.0503
.80	51.	1.5	-4.12	.64	85.	.711	.683	.0519
.90	59.	1.7	-3.94	.69	89.	.709	.703	.0536
1.00	66.	1.9	-3.78	.74	94.	.709	.719	.0550
1.10	74.	2.1	-3.63	.79	98.	.711	.731	.0557
1.20	83.	2.4	-3.51	.84	102.	.714	.743	.0566
DWL 1.25	87.	2.5	-3.45	.86	104.	.715	.749	.0570

## HYDROSTATICS - PART II TRIM 1.089 FEET

DRAFT	WPLANE AREA	LCF	TPI	CIDOFTH	LONG. BM	TRNSV BM	LONG. KM	TRNSV KM	MT1
.50	65.	-3.49	.15	.36	24.1	5.64	24.6	6.14	.1
.60	69.	-3.23	.16	.35	22.5	5.06	23.1	5.60	.1
.70	72.	-3.02	.17	.34	21.0	4.50	21.6	5.09	.1
.80	74.	-2.84	.18	.34	19.8	4.06	20.4	4.70	.1
.90	77.	-2.67	.18	.33	18.7	3.73	19.4	4.41	.1
1.00	79.	-2.52	.19	.32	17.8	3.44	18.5	4.18	.2
1.10	81.	-2.41	.19	.31	16.8	3.17	17.6	3.96	.2
1.20	83.	-2.30	.20	.30	16.0	2.96	16.9	3.80	.2
DWL 1.25	84.	-2.24	.20	.30	15.6	2.87	16.5	3.73	.2

## HYDROSTATICS - PART I TRIM .803 FEET

DRAFT	VOLUME	DISPLACEMENT	LCB	KB	WETTED SURFACE	PRISMATIC COEF	WPLANE COEF	WPLANE I COEF
.50	26.	.8	-4.55	.45	70.	.734	.615	.0451
.60	33.	.9	-4.28	.50	75.	.711	.649	.0486
.70	40.	1.2	-4.06	.55	80.	.702	.673	.0507
.80	48.	1.4	-3.86	.60	85.	.699	.693	.0523
.90	55.	1.6	-3.69	.65	90.	.700	.713	.0542
1.00	63.	1.8	-3.54	.70	94.	.702	.727	.0552
1.10	71.	2.0	-3.41	.75	98.	.706	.739	.0560
1.20	80.	2.3	-3.29	.81	102.	.709	.751	.0569
DWL 1.25	84.	2.4	-3.23	.83	104.	.711	.756	.0572

## HYDROSTATICS - PART II TRIM .803 FEET

DRAFT	WPLANE AREA	LCF	TPI	CIDOFIS	LONG. BM	TRNSV BM	LONG. KM	TRNSV KM	MT1
.50	65.	-3.38	.16	.35	28.8	6.35	29.3	6.80	.1
.60	70.	-3.12	.17	.34	26.1	5.57	26.6	6.07	.1
.70	73.	-2.91	.17	.33	23.9	4.88	24.5	5.43	.1
.80	75.	-2.72	.18	.33	22.2	4.34	22.8	4.94	.1
.90	78.	-2.55	.19	.32	20.8	3.96	21.4	4.61	.2
1.00	80.	-2.42	.19	.31	19.4	3.60	20.1	4.30	.2
1.10	82.	-2.31	.20	.30	18.2	3.30	18.9	4.06	.2
1.20	84.	-2.20	.20	.29	17.2	3.07	18.0	3.88	.2
DWL 1.25	85.	-2.16	.20	.29	16.7	2.96	17.5	3.79	.2

## HYDROSTATICS - PART I      TRIM      .787 FEET

DRAFT	VOLUME	DISPLACEMENT	LCB	KB	WETTED SURFACE	PRISMATIC COEF	WPLANE COEF	WPLANE I COEF
.50	26.	.7	-4.53	.45	70.	.732	.616	.0451
.60	33.	.9	-4.27	.50	75.	.710	.649	.0486
.70	40.	1.1	-4.04	.55	80.	.701	.673	.0507
.80	48.	1.4	-3.85	.60	85.	.698	.694	.0523
.90	55.	1.6	-3.68	.65	90.	.699	.714	.0542
1.00	63.	1.8	-3.52	.70	94.	.702	.728	.0552
1.10	71.	2.0	-3.39	.75	98.	.705	.740	.0560
1.20	80.	2.3	-3.27	.80	102.	.709	.752	.0569
DWL 1.25	84.	2.4	-3.22	.83	104.	.711	.756	.0572

## HYDROSTATICS - PART II      TRIM      .787 FEET

DRAFT	WPLANE AREA	LCF	TPI	CIDOFIS	LONG. BM	TRNSV BM	LONG. KM	TRNSV KM	MT1
.50	66.	-3.38	.16	.35	29.1	6.39	29.6	6.84	.1
.60	70.	-3.11	.17	.34	26.4	5.60	26.9	6.10	.1
.70	73.	-2.90	.17	.33	24.1	4.90	24.7	5.45	.1
.80	75.	-2.72	.18	.33	22.3	4.36	22.9	4.96	.1
.90	78.	-2.55	.19	.32	20.9	3.97	21.5	4.62	.2
1.00	80.	-2.42	.19	.31	19.5	3.61	20.2	4.31	.2
1.10	82.	-2.31	.20	.30	18.3	3.31	19.0	4.06	.2
1.20	84.	-2.20	.20	.29	17.2	3.08	18.0	3.88	.2
DWL 1.25	85.	-2.16	.20	.29	16.7	2.97	17.6	3.80	.2



## SECTIONAL AREAS IN SQUARE FEET - PART 1 TRIM 1.506 FEET

STATION	.000	1.000	2.000	3.000	4.000	5.000	6.000	7.000
DRAFT								
.50	.00	.00	.00	.00	.00	.02	.16	.38
.60	.00	.00	.00	.00	.00	.09	.31	.64
.70	.00	.00	.00	.00	.01	.19	.51	.97
.80	.00	.00	.00	.00	.05	.33	.76	1.37
.90	.00	.00	.00	.00	.13	.51	1.07	1.83
1.00	.00	.00	.00	.00	.23	.73	1.42	2.37
1.10	.00	.00	.00	.01	.37	1.00	1.82	2.94
1.20	.00	.00	.00	.05	.54	1.30	2.27	3.51
DWL 1.25	.00	.00	.00	.08	.64	1.46	2.51	3.80

## SECTIONAL AREAS IN SQUARE FEET - PART 2 TRIM 1.506 FEET

STATION	8.000	9.000	10.000	11.000	12.000	13.000	14.000	15.000
DRAFT								
.50	.76	1.26	1.97	2.46	2.96	3.46	3.97	4.48
.60	1.16	1.81	2.56	3.06	3.56	4.07	4.58	5.09
.70	1.66	2.39	3.16	3.66	4.17	4.68	5.19	5.70
.80	2.22	2.98	3.76	4.27	4.77	5.29	5.80	6.32
.90	2.81	3.58	4.36	4.87	5.39	5.90	6.42	6.94
1.00	3.40	4.18	4.97	5.49	6.00	6.52	7.05	7.57
1.10	3.99	4.78	5.59	6.11	6.62	7.15	7.67	8.20
1.20	4.58	5.39	6.21	6.73	7.25	7.78	8.30	8.84
DWL 1.25	4.88	5.69	6.52	7.04	7.56	8.09	8.62	9.16

## SECTIONAL AREAS IN SQUARE FEET - PART 3 TRIM 1.506 FEET

STATION	16.000	17.000	18.000
DRAFT			
.50	4.99	5.50	6.02
.60	5.60	6.12	6.64
.70	6.22	6.74	7.26
.80	6.84	7.36	7.89
.90	7.47	7.99	8.52
1.00	8.10	8.63	9.16
1.10	8.73	9.27	9.80
1.20	9.37	9.91	10.45
DWL 1.25	9.69	10.23	10.77

## SECTIONAL AREAS IN SQUARE FEET - PART 1 TRIM 1.089 FEET

STATION	.000	1.000	2.000	3.000	4.000	5.000	6.000	7.000
DRAFT								
.50	.00	.00	.00	.00	.00	.08	.26	.49
.60	.00	.00	.00	.00	.01	.18	.45	.79
.70	.00	.00	.00	.00	.06	.32	.68	1.15
.80	.00	.00	.00	.00	.14	.50	.97	1.58
.90	.00	.00	.00	0.00	.25	.72	1.30	2.07
1.00	.00	.00	.00	.03	.40	.98	1.69	2.63
1.10	.00	.00	.00	.08	.57	1.27	2.13	3.20
1.20	.00	.00	.00	.15	.78	1.61	2.61	3.78
DWL 1.25	.00	.00	.00	.20	.90	1.80	2.87	4.06

## SECTIONAL AREAS IN SQUARE FEET - PART 2 TRIM 1.089 FEET

STATION	8.000	9.000	10.000	11.000	12.000	13.000	14.000	15.000
DRAFT								
.50	.84	1.26	1.83	2.19	2.55	2.91	3.27	3.63
.60	1.27	1.81	2.42	2.78	3.14	3.51	3.87	4.24
.70	1.78	2.39	3.02	3.38	3.75	4.11	4.48	4.85
.80	2.36	2.98	3.62	3.98	4.35	4.72	5.09	5.46
.90	2.94	3.58	4.22	4.59	4.96	5.33	5.70	6.08
1.00	3.53	4.18	4.83	5.20	5.57	5.95	6.32	6.70
1.10	4.13	4.78	5.45	5.82	6.19	6.57	6.95	7.33
1.20	4.72	5.39	6.06	6.44	6.81	7.19	7.57	7.95
DWL 1.25	5.02	5.69	6.37	6.75	7.13	7.51	7.89	8.27

## SECTIONAL AREAS IN SQUARE FEET - PART 3 TRIM 1.089 FEET

STATION	16.000	17.000	18.000
DRAFT			
.50	4.00	4.37	4.74
.60	4.61	4.98	5.35
.70	5.22	5.59	5.96
.80	5.83	6.21	6.58
.90	6.45	6.83	7.21
1.00	7.08	7.46	7.84
1.10	7.71	8.09	8.47
1.20	8.34	8.72	9.11
DWL 1.25	8.66	9.04	9.43

## SECTIONAL AREAS IN SQUARE FEET - PART 1 TRIM .803 FEET

STATION	.000	1.000	2.000	3.000	4.000	5.000	6.000	7.000
DRAFT								
.50	.00	.00	.00	.00	.01	.14	.34	.58
.60	.00	.00	.00	.00	.05	.26	.55	.89
.70	.00	.00	.00	.00	.12	.43	.81	1.28
.80	.00	.00	.00	0.00	.23	.63	1.12	1.73
.90	.00	.00	.00	.03	.36	.88	1.48	2.24
1.00	.00	.00	.00	.07	.53	1.16	1.89	2.81
1.10	.00	.00	.00	.15	.73	1.49	2.35	3.38
1.20	.00	.00	.00	.25	.97	1.85	2.86	3.96
DWL 1.25	.00	.00	.00	.31	1.10	2.05	3.13	4.25

## SECTIONAL AREAS IN SQUARE FEET - PART 2 TRIM .803 FEET

STATION	8.000	9.000	10.000	11.000	12.000	13.000	14.000	15.000
DRAFT								
.50	.91	1.26	1.74	2.00	2.26	2.53	2.79	3.06
.60	1.35	1.81	2.33	2.59	2.86	3.13	3.39	3.66
.70	1.87	2.39	2.92	3.19	3.46	3.73	4.00	4.27
.80	2.45	2.98	3.52	3.79	4.06	4.33	4.60	4.88
.90	3.04	3.58	4.13	4.40	4.67	4.94	5.22	5.49
1.00	3.63	4.18	4.74	5.01	5.28	5.56	5.83	6.11
1.10	4.22	4.78	5.35	5.62	5.90	6.17	6.45	6.73
1.20	4.82	5.39	5.96	6.24	6.52	6.80	7.07	7.35
DWL 1.25	5.12	5.69	6.27	6.55	6.83	7.11	7.39	7.67

## SECTIONAL AREAS IN SQUARE FEET - PART 3 TRIM .803 FEET

STATION	16.000	17.000	18.000
DRAFT			
.50	3.33	3.60	3.87
.60	3.93	4.20	4.47
.70	4.54	4.81	5.08
.80	5.15	5.42	5.70
.90	5.76	6.04	6.32
1.00	6.38	6.66	6.94
1.10	7.01	7.29	7.57
1.20	7.63	7.92	8.20
DWL 1.25	7.95	8.23	8.52

SECTIONAL AREAS IN SQUARE FEET - PART 1 TRIM .787 FEET

STATION	.000	1.000	2.000	3.000	4.000	5.000	6.000	7.000
DRAFT								
.50	.00	.00	.00	.00	.01	.14	.35	.59
.60	.00	.00	.00	.00	.05	.27	.56	.90
.70	.00	.00	.00	.00	.13	.43	.82	1.28
.80	.00	.00	.00	0.00	.23	.64	1.13	1.73
.90	.00	.00	.00	.03	.37	.89	1.49	2.25
1.00	.00	.00	.00	.08	.54	1.17	1.90	2.82
1.10	.00	.00	.00	.15	.74	1.50	2.37	3.39
1.20	.00	.00	.00	.26	.98	1.86	2.88	3.97
DWL 1.25	.00	.00	.00	.32	1.11	2.06	3.14	4.26

SECTIONAL AREAS IN SQUARE FEET - PART 2 TRIM .787 FEET

STATION	8.000	9.000	10.000	11.000	12.000	13.000	14.000	15.000
DRAFT								
.50	.91	1.26	1.73	1.99	2.25	2.51	2.77	3.03
.60	1.35	1.81	2.32	2.58	2.84	3.10	3.37	3.63
.70	1.88	2.39	2.92	3.18	3.44	3.71	3.97	4.24
.80	2.46	2.98	3.52	3.78	4.05	4.31	4.58	4.84
.90	3.04	3.58	4.12	4.39	4.65	4.92	5.19	5.46
1.00	3.63	4.18	4.73	5.00	5.27	5.53	5.80	6.07
1.10	4.22	4.78	5.34	5.61	5.88	6.15	6.42	6.70
1.20	4.82	5.39	5.96	6.23	6.50	6.77	7.05	7.32
DWL 1.25	5.12	5.69	6.27	6.54	6.81	7.09	7.36	7.64

SECTIONAL AREAS IN SQUARE FEET - PART 3 TRIM .787 FEET

STATION	16.000	17.000	18.000
DRAFT			
.50	3.29	3.55	3.82
.60	3.89	4.16	4.42
.70	4.50	4.77	5.03
.80	5.11	5.38	5.65
.90	5.73	6.00	6.27
1.00	6.35	6.62	6.89
1.10	6.97	7.24	7.52
1.20	7.60	7.87	8.15
DWL 1.25	7.91	8.19	8.46

27 JUNE 1991

# TABLE OF OFFSETS



## UL GENERIC 18' PLANING HULL

LOA = 18.0'

BOA = 7.0'

STATION SPACING = 1.0'

ALL DIMENSIONS ARE IN FEET

<u>STA NO.</u>	<u>PROFILE HT.</u>	<u>CHINE</u>		<u>DECK</u>	
		<u>HT</u>	<u>1/2 BEAM</u>	<u>HT</u>	<u>1/2 BEAM</u>
0	4.083	—	—	4.104	—
1	2.292	—	—	3.979	1.333
2	1.125	2.042	0.708	3.875	2.167
3	0.500	1.750	1.625	3.813	2.708
4	0.208	1.521	2.125	3.708	3.021
5	0.063	1.292	2.458	3.625	3.229
6	0.000	1.063	2.667	3.521	3.333
7		0.833	2.833	3.458	3.417
8		0.667	2.896	3.333	3.458
9		0.583	2.917	3.271	3.500
10		0.500	2.938	3.208	
11					
12					
13					
14					
15					
16					
17					
TRANSOM		